UNFAIRNESS IN SALES TEAMS:

A BEHAVIORAL EXPLORATION

A Dissertation

Presented to

The Faculty of the C.T. Bauer College of Business

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

By

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August, 2014

UNFAIRNESS IN SALES TEAMS:

A BEHAVIORAL EXPLORATION

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ACKNOWLEDGEMENTS

My sincerest gratitude to my supervisor, Singin' Jimmy, whose selfless time and care were sometimes all that kept me going. My deep appreciation to my committee members, Niladri Syam, who walked along with me whenever I needed it most, Mike Ahearne, whose wisdom and humor I enjoyed so much, and Steve Werner, who gave me helpful and constructive feedback on this dissertation. The funding provided by the Jesse Jones Dissertation Completion Grant is greatly acknowledged.

My special thanks to Betsy Gelb, without whom I would not be here, Jackie Kacen, who always cares for me, Vanessa Patrick, who taught me how to be an academic mom, Ed Blair, who is sharp in the seminar and supportive in his office, Steve Brown, who gave me his precious time, Carl Hermann, who generously offered his insight, Hua, who guided me through my darkest time, Jeff, who has been trustworthy, helpful and inspiring, Rambod, who always backs me up, Sina, who said little but helped a lot, Weixing, who provided me an invaluable outlet for both laughter and tears. Grateful thanks to all of the faculty, staff, and PhD students in our department and my friends in Houston, who have been very supportive of me.

My deepest thanks to my parents for their endless love and timely encouragement, my husband, Wei, for his love and unwavering support, and my son, Max, for bringing me joy.

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Unfairness in sales force compensation is a very challenging problem in global sales organizations. Sales executives find a growing number of complaints of unfair compensation from field salespeople. While some salespeople think it is alright to get same compensation plan as someone less competent, others might think it is totally unfair to them. When salespeople perceive they are not compensated fairly, they become less motivated, get slack, destroy morale, kill teamwork, or even worse, quit. How do feelings of unfairness about the compensation system affect salespeople's decisions and firm's profit? I endeavor to solve this challenging managerial problem of unfairness in the team-based compensation. I first built up a principle-agent model for a sales team of two salespeople, who have different roles and responsibilities and different preferences for inequity. I then use laboratory experiments to test the theory predictions and estimate inequity aversion of salespeople in a sales team.

In particular, Essay 1 builds an analytical model of sales team to tackle the managerial problem of motivating team-selling salespeople effectively when team-based rewards engender a sense of unfairness. By introducing inequity aversion into standard principal-agent analytic models of sales team, I have obtained the equilibrium effort decisions for both the manager and the salesperson in a sales team. When the sales

manager has to do both selling and coaching and the salesperson only has to sell, their effort decisions depend on not only their own commission rates but also their team member's. In addition, their inequity aversion with respect to commission rate difference will reduce their effort levels and firm's profit. If the firm realizes the inequity aversion of these salespeople, equal commission rates will be offered to mitigate the impacts of inequity aversion. Surprisingly, I found that, in some circumstance, the more inequity averse the sales manager is, the more help is he willing to give to the salesperson who is earning higher commission rate than him. However, this surprising result vanishes with homogeneous commission rates.

Essay 2 tests whether the manager and the salesperson conforms to the theory in their effort decisions in a laboratory experiment. I conducted 2x2 between-subject experiments with two levels of commission rates and salaries for the manager while those of the salesperson are held as constant. By manipulating inequity, I am able to empirically estimate both disadvantageous inequity aversion, envy, by the manager and advantageous inequity aversion, guilt, by the salesperson. I have found the manager has envy for commission rate but not so much for the salary. In comparison, the salesperson does not feel guilty regarding to their higher commission rates and/or higher salaries. Although they do not share a common belief in each other's inequity aversion, their decisions of efforts and switching to another pay reflects their preferences to other person's commission rate but not salary.

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1. Introduction

In the past decades, exponentially advancing technology and sophisticated customers make selling more complex. To cope with the complexity, many organizations are employing team selling, which is a double-edged sword. While team selling makes selling more efficient and cost effective, many issues arise, such as free-riding, asymmetric information between the firm and the salespeople. Since sales are non-attributable to individuals' efforts, firms often use team-based compensation. However, we often see sales force complain about unfair compensation, especially from global sales organizations who heavily reply on team selling (Capon, 2011, Ch 4; Zoltners, 2013). For example, experienced salespeople might think it unfair to equally split the team-based rewards with rookies, because they think they contribute more to the team sales; team managers might think it unfair to receive less commission rate than the fellow salespeople, because they not only sell themselves but coach and train salespeople to excel. If we fail to take into account of these fairness concerns in team-based compensation, the salespeople will be demotivated, or even worse, quit, and thus causes inestimable losses to firms.

To respond the pressing demand of a fair compensation from sales organizations, this essay proposes an analytical model on team selling and quantifies the impact of unfairness of salespeople. More specifically, the model incorporates the multi-dimensional heterogeneity of salespeople, including the selling capability for the salespeople, coaching capability for the team manager, and perceptions of fairness for both. To briefly define the scope of this essay, I study a typical sales team that is composed of a team manager and several salespeople and I am interested in a situation

where different salaries and commissions engender feelings of unfairness. I have chosen salary and commissions based on team total sales as the compensation for the sales teams. The reasons are as follows. First, commission rates and/or bonus quota have been identified as the most prevalent among team-selling salespeople (SAMA and ZS Associates, 2011). Second, in terms of the bases for compensation, Moorman and Albrecht from ZS Associates (2008) develop more than 700 sales force compensation plans and find that team-based rewards are prevalent in compensating team-selling sales force.

Issues of fairness have been brought to the attention to marketing scholars in several areas, including firms' pricing behavior (Kahneman Knetsch and Thaler 1986), distribution channel commitment (Anderson and Weitz, 1992) and coordination (Cui, Raju and Zhang, 2007; Ho, Su and Wu, 2013). While most research of sales investigates the importance of fairness in personal selling (Dubinsky and Levy 1989; Tyagi 1990; Smith, Jones, and Blair 2000; Ramaswami and Singh 2003; Arnold et al. 2008), surprisingly very limited research has addressed the fairness issues in team selling. In Business to Business (B2B) sales, team selling is the predominant selling structure. One of the most common is key account sales teams. A key account sales team consists of a leader, called the key account manager, and several sales and technical specialists, all devoted to the joint purchases of a single buyer, the key account. In such a context, a team member, either the key account manager or the specialists, who does not receive an incentive in proportional to his/her contribution to team sales, might feel unfairly treated.

This essay tackles the managerial problem of motivating team-selling salespeople effectively when team-based rewards engender a sense of unfairness. This essay will be

the first to quantify the impact of unfairness in the context of sales teams by examining sales teams analytically. The analytical approach enables a novel model with theoretical predictions on how unfairness impacts salespeople's effort decisions in sales teams. It will bridge the gap between practitioners and academics by introducing human factors into standard principal-agent analytic models of sales team.

The remainder of this essay is organized as follows. Section 2 gives a brief review of fairness in economics and marketing literature. Section 3 develops two analytical models to explain the roles of team manager and salesperson and how inequity aversion impacts on their effort decisions and the firm's profit. Section 4 discusses the managerial implications of the theoretical predictions.

2. Literature Review

Fairness is an important psychological factor in sales teams. A fair outcome is one in accordance with merit or contribution. There are several variants of the meaning of fairness that I will summarize next. Although I'm most interested in distributive fairness, I will first go over the literature on all related concepts of fairness and then compensation for sales teams.

2.1 Fairness in Management

Fairness in management often refers to the organizational justice or fairness, terms which are often used interchangeably. As used by Greenberg (1987), organizational justice means people's perceptions of fairness in organizations. This construct incorporates three forms of fairness: distributive, procedural, and interactional fairness.

Distributive fairness refers to the fairness of decision outcomes, and individuals judge it by determining whether the perceived ratio of outcomes to inputs matches those

of a comparison other individuals, or alternatively whether resource allocations match appropriate norms. Distributive justice is the fairness of the actual rewards given to an employee (Cohen, 1987). In contrast, procedure fairness concerns the fairness and the transparency of the processes by which decisions are made, and interactional fairness deals with two types of interpersonal treatment, interpersonal justice and informational justice. These two types of fairness are beyond the scope of this essay, because the actual allocation or distribution of rewards is foremost important of majority sales compensation executive interests at this moment. Therefore, it's worth noting that fairness in this essay relates to distributive justice and individual equity in the extant management literature.

Distributive fairness has its genesis in Adams' (1963, 1965) equity theory. According to this theory, employees judge whether they have been treated fairly or not based on their own input (e.g., time or effort) versus output (e.g., pay or status) ratio compared with others. A ratio in their favor may result in guilt, embarrassment or remorse, whereas if the referent's ratio is more favorable, then envy, anger and resentment may result. Later, Deutsch (1975) and Leventhal (1976) shifted focus from the reactions of rewards recipients to the behavior of reward allocators. They define allocation norm as "a social rule which specifies criteria that define certain distributions of rewards and resources as fair and just" (p. 94) and propose equality and need-based rules.

From social psychology and sociology, one key insight is that relative material payoffs affect people's well-being and behavior. Agell and Lundborg (1995) and Bewley (1998) show that relative pay-off considerations constitute an important constraint for the internal wage structure of firms. Clark and Oswald (1996) show that comparison incomes

have a significant impact on overall job satisfaction. Consequently, these fair or unfair outcomes may result in employees' satisfaction or dissatisfaction, low/high productivity, and decisions to stay with or leave the organization (Mowday and Colwell, 2003). Among the work in the relationship of unfairness-performance, there has been mixed finding on which form of unfairness affects performance. For example, Masterson et al. (2000) find that procedural justice perceptions affect organization-related outcomes, such as performance, organizational citizenship behaviors directed at the supervisor, and job satisfaction. In the context of salespeople, Roberts, Coulson and Chonko (1999) find that distributive justice is more important in predicting salespeople's outcomes because salespeople are normally judged and paid by the outcomes. In consistent with their work, Ramaswami and Singh (2003) also find a positive impact of distributive justice, rather than procedural justice, on industrial salespeople's job performance.

In summary, I believe that salespeople compare relative payoffs and might have feelings of distributive unfairness which influence their effort decisions.

2.2 Fairness in Economics

Fairness has been first noticed by labor economists. Akerlof (1982) finds that workers' effort depends upon the norms determining a fair day's work. In order to affect those norms, firms may pay more than the market-clearing wage. Bishop (1987) discovers that an individual's relative wage depends on his/her productivity relative to others doing the same job. Baron (1988) states that formal models of employment relations in economics might be enriched by incorporating sociological and social psychological forces in shaping employment systems, such as work place "atmosphere", equity, and the "control costs" that workers associate with various systems of rewarding

and monitoring labor. Levine (1991, 1993) argues that considerations of equity are also of considerable importance in tempering the responses of compensation executives.

Fairness has been introduced to game theory since Rabin's first advocacy in 1993. According to Rabin (1993), an action is perceived as fair if the intention that is behind the action is kind, and as unfair if the intention is hostile. The kindness or the hostility of the intention, in turn, depends on the equitability of the payoff distribution induced by the action. He summarizes three stylized facts: 1) people are willing to sacrifice their own material well-being to help those who are being kind; 2) people are willing to sacrifice their own material well-being to punish those who are being unkind; 3) Both motivations 1) and 2) have a greater effect on behavior as the material cost of sacrificing becomes smaller. In comparison, Fehr and Schmidt (1999) do not model intentions explicitly as Rabin did. In their seminal paper, fairness is modeled as self-centered inequity aversion. The fairness of their own material payoff relative to the payoff of others is divided as advantageous and disadvantage fairness. Loewenstein, Thompson, and Bazerman (1989) found people care more about disadvantageous fairness and this differs in reference groups. The reference group is simply the set of subjects playing against each other and is influenced by the social context, the saliency of particular agents, and the social proximity among individuals. For each reference group, there is a reference point, i.e., the equitable outcome, which is given by the egalitarian outcome. Both Rabin's model and Fehr's model are based on the notion of an equitable outcome.

Recognizing the importance of fairness, let us take a look at the three most prominent fairness ideals in literature: strict libertarianism, strict egalitarianism, and liberal egalitarianism (Cappelen et al. 2007). For our team-selling salespeople, strict

egalitarianism suggests that the compensation for each salesperson should be equal even if each has different selling ability or helping behavior; strict libertarianism deems that the payoff for each salesperson should be in proportion to their total contributions, including both the controllable and uncontrollable factors; liberal egalitarianism argues that only the controllable factor should be taken into account when dividing the payoffs among team members.

In the experimental economics, fairness has been a hot topic since the Ultimatum Game by Güth et al. (1982). In other lab experiments, researchers also find that subjects are averse to both disadvantageous and advantageous inequality between themselves and their partners (Loewenstein et al. 1989, Hackett 1994).

Built upon this line of literature, I will develop different models of horizontal (among the salespeople on the same level) and vertical unfairness (between team manager and salespeople) to investigate what determines team-selling salespeople's unfairness and how does it influence their efforts.

2.3 Fairness in Marketing and Sales

The application of fairness has been explored in many areas of marketing. In sales, Tyagi's (1990) study of insurance salespeople found that their perception of money inequity (among other inequities such as supervisor, promotion, recognition etc.) had a significant adverse effect on extrinsic motivation of insurance salespeople. Dubinsky and Levy (1989) also found fairness perception of pay administration to be positively related to retail salespeople's motivation. Smith, Jones, and Blair (2000) found unfairness is playing an important role for salespeople experiencing a reduction in territory potential

when territory realignment occurs. All these lend support for a positive relationship between fairness and salesperson motivation.

In marketing, distributive fairness is common to not only individuals as economic agents (Freedman 1976) but to firms (Rhode 1985, Kumar 1996, Scheer et al. 2003). Cui (2007) first studied distributive fairness in distributional channels. Consistent with distributive fairness (Macneil 1980, Frazier 1983), channel specialists considers payoff equitable if the amount he deems deserving relative to the manufacturer's payoff. As in Fehr and Schmidt (1999, p. 819), Cui (2007) models distributive fairness as inequity, that is, the channel specialist is willing to "give up some monetary payoff to move in the direction of more equitable outcomes." Disadvantageous inequity occurs when the channel specialist's monetary payoff is lower than the equitable payoff. Further, Cui and Mallucci (2012) analytically and experimentally evaluate how firms make decisions in a two-stage dyadic channel, in which firms decide on investments in the first stage and then on prices in the second stage. They find that firms' behaviors differ significantly from the predictions of the standard economic model. A new principle of distributive fairness (the sequence-aligned ideal) outperforms other fairness ideals (strict egalitarianism, liberal egalitarianism, and libertarianism idelas) in explaining the firms' pricing behavior (Cappelen et al. 2007).

In sales, Ramaswami and Singh (2003) initially propose the importance of salespeople's merit pay fairness. They use equity and social exchange theories and identify three dimensions of fairness: distributive, procedural, and interactional. They examine the impact of fairness on salespeople's performance and find interactional fairness slightly more important than the other two, and that distributive fairness directly

influences job performance. However, their data is purely based on one Fortune 500 firm. Arnold et al. (2008) continue this research in the outcomes of salespeople's fairness by a cross-industry data and reveal how the distributive fairness affects satisfaction, voice, and quit. Instead of focusing on the outcome fairness, as Ramaswami and Singh (2003) do, Arnold et al. (2008) include the formulation of fairness judgment. One of the equity judgments they find is based on referent comparisons with other salespeople within the firm.

2.4 Compensation of Sales Teams

Since Holmstrom (1982), economists have consistently concerned about the problem with team incentives (Itoh 1991). The advantage of using teams rather than individuals in nonmarket organization is more information, with the disadvantage of free-riding. However, it may inevitably bring about some other non-traditional economic concerns among team members, such as inequity and fairness. While standard economic literature mostly considers economic costs only, recently researchers have brought social psychological costs into consideration (Fehr and Falk 2002; Itoh 2004; Grund and Sliwka 2005). Despite recent analytical (Rey-Biel 2008) and laboratory researches on the group incentive (Chen, Ham and Lim, 2011; Chen and Lim, 2013; Lim and Chen, 2014), fairness in channel distribution (Cui, Raju, and Zhang, 2007; Cui and Mallucci, 2012; Mallucci, Cui, and Wu 2014), the extant literature studies salesforce compensation analytically at individual level (Joseph and Kalwani 1998; Steenburgh 2008; Chung, Steenburgh and Sudhir 2010; Lal and Srinivasan 1993; Mantrala, Sinha, and Zoltners 1994). In team selling, the outcome is not directly attributed to individual salespeople and compensation of individuals in a team-context has not been heavily studied.

I am contributing to the literature on team based sales force compensation in the following way. First, I initiated a game theoretical analysis of salary and commissions, a very popular form of team-based compensation in practice. Second, I built a model on a sales team of two heterogeneous salespeople in different roles. In the simple model, the manager has multiple roles, selling, coaching and guiding, and the salesperson is just selling. This basis model captures the essence of differentiated roles of the manager and the rest of salespeople and can be easily extended to a general form of sales team, one manager and multiple salespeople. Third, I made the first attempt to incorporate the unfairness concerns of these salespeople into the analytical model and derived the equilibrium efforts for both the manager and the salesperson in a more realistic setting, i.e., salespeople in the filed do care about the fairness in the compensation. Although the finding that inequity aversion impacts the salespeople's effort decision is expected, I found something interesting for the manager. While convention wisdom tells us that the more inequity averse a person is, the less likely s/he is helping the other person who is being favored over him/her. This is not I found through the model. Our model predicts under some circumstance, the more inequity averse the manager is, the more help is s/he willing to give to the other salesperson in the sales team who is earning higher commission rate than him/her. Lastly but not the least, I analytically allowed the firm to choose the optimal salaries and commission rates. When the firm maximizes the expected profit and made optimal choices, the interesting finding goes away. This is because the firm knows the inequity might hurt the profit if salespeople are inequity averse. Therefore, the firm's best strategy is just setting up the compensation equally so that the inequity won't occur in the first place. It is also interesting to note that in practice that many sales

organizations who largely use sales team give higher salaries and lower commission rates to managers and lower salaries and higher commission rates to salespeople. I would like to use our model to justify this choice and make broader managerial implications.

In summary, practitioners rely on team selling but compensate team members in an intuitive fashion. What happens to the sales team if this compensation creates unfairness? I endeavor to design optimal team-based compensation plans to motivate collaboration in a team while recognizing individuals' inequity aversion.

3. Model

3.1 Model Set-up

What is a team? Marschak and Radner (1972, pg. 9) discuss an economic theory of teams and define a team as an organization the members of which have only common interests. Canon-Bowers et al. (1993) define it as "a team is a group of two or more people who must interact cooperatively and adaptively in pursuit of shared, valued objectives." Glassop (2002) defined it as "teams are a set of interdependent individuals bound by a collective aim". I agree with these researchers in that the team should share a common goal and people in the team interact with each other. In this essay, salespeople interact with each other and share the common goal of increasing the total sales of the team.

What are the primary roles for team manager and salespeople? Team managers usually have multiple roles, including "coaching", "selling", and "guiding", corresponding to the three roles of team manager summarized by Zoltners, Sinha, and Lorimer (2012): people, customer, and business manager. Being an excellent team manager is not only about knowing the job of selling, but also about counseling, coaching,

and motivating salespeople. I can categorize variety of activities into two broad ones: selling and coaching. Selling would include not only the physical activities of selling but developing relationships, implementing deal operationally, developing industry knowledge, strategy, and planning. On the other hand, coaching would include activities such as ensuring internal alignment for deal commercially, understanding of internal capability, training, solving internal day-to-day problems, and managing the team.

In addition to selling and coaching, I name another function of team manager "guiding", which is more applicable to key account sales teams, a special form of team selling. A key account sales team is usually composed of a key account manager (KAM) and several product specialists. In such a context, selling and coaching are partially equivalent to implementation and facilitation, or internal and customer-facing (McDonald and Woodburn, 2007, p. 292; McDonald and Woodburn, 2011). The implementation role requires the KAM to be the expert on the customer, which focuses on coordination. The facilitation role indicates developing relationship and being an ambassador for the customer. Similarly, in the spectrum of internal and customer-facing, the former requires the KAM to be a good team leader who can provide appropriate support and coaching and utilize right resources, and the latter views the KAM as a customer expert. It's worth noting that the common theme in both perspectives is the KAM's guidance in directing the teams' effort.

3.2 Coaching Model

In the simple model of coaching, I do not consider any other-regarding preferences, i.e. inequity aversion. The simple sales team consists of one manager and one salesperson. For easy reference, I now refer team manager by she or her and the

salesperson by he or him. I want to introduce unfairness in the simplest sales team that involves interpersonal interaction without complex factors. This model can easily be extended to one manager with multiple salespeople.

Critical to any sales model is the sales response function which relates the activities of the sales team to the unit sales forthcoming form customers. A team has at least one common outcome, but not necessarily only common outcomes. A sales team has common unit sales but different individualized costs and compensation rates. The common unit sales are caused in part by the separate activities of the team manager and the salesperson. All models of personal selling must address the relationship between activities and sales, called the sales response function.

The team manager both coaches the salesperson and interacts with the customer, and I call the former coaching effort e_c and the latter selling effort e_s. Similarly, the salesperson interacts with the customer and I call this salesperson's selling effort e_1. Together these help generate team sales in an amount $TS = e_s + (\lambda_1 + \gamma e_c)e_1 + \varepsilon$, where manager's selling capability coefficient is normalized to be 1, λ_1 is the selling capability coefficients for salesperson 1, γ is the coaching coefficient of the manager, e_1 is salesperson 1's effort, and ε is the random component in sales with a Normal distribution, N(0, 1).

The team manager and salesperson are paid based upon the common team sales, TS, but at different rates. Both of them receive basic salary, S_m for the manager, and S_1 for the salesperson. The commission rates given to manager and team member are C_m and C respectively. In addition, they have different individualized costs of doing their jobs. Since the manager is selling and coaching at same time and can choose how much

time to spend in selling vs coaching, the cost structure of the manager is composed of three components. The first component is selling. It is intuitive to think the manager would do easy jobs first and as things progress the task will get more and more difficult. The same logic also applies to the second component, coaching. Therefore both selling and coaching costs rise with effort at an increasing rate. In addition, the two tasks are disruptive and I add an interaction term with a distracting factor of δ to the first two components. Together, I could write costs as $\text{Cost}_m = \frac{1}{2}e_s^2 + \frac{1}{2}e_c^2 + \delta e_s e_c$, or $\text{Cost}_m = \left(\frac{1}{2}e_s\right)e_s + \left(\frac{1}{2}e_c + \delta e_s\right)e_c$. The marginal cost of selling effort increases with selling effort and the marginal cost of coaching effort rise both with coaching effort and selling effort, where δ captures the degree to which marginal cost of coaching is determined by selling effort. In comparison to the manager, the salesperson only has a selling cost $\frac{1}{2}e_1^2$.

Unlike Marschak and Radners's "team theory", these teammates have different but interrelated objectives. They maximize their own utilities, which depend on their salary, commissions, cost, and risks. Both manager and salesperson are risk-averse, with a Constant Absolute Risk Aversion (CARA) and the random variable is Normal. Under these assumptions, the certainty equivalent for the manager is $CE_m = S_m + C_m TS - \frac{1}{2}e_c{}^2 - \frac{1}{2}e_s^2 - \delta e_s e_c - \frac{1}{2}rC_m^2$, where S_m, C_m are the salary and commission rate for the manager. Similarly, the certainty equivalent of salesperson is $CE_1 = S_1 + C_1 \cdot TS - \frac{1}{2}e_1^2 - \frac{1}{2}rC_1^2$, where S_1, C_1 are the salary and commission rate for the

salesperson. The optimal effort of the team manager depends upon the effort of the salesperson and vice versa. Taking two first-order conditions of both certainty equivalents with respect to efforts, I can solve for the equilibrium efforts of manager's coaching and selling as below,

$$e_s = \frac{C_m\left(1-\delta\gamma\lambda_1 C_1 - \gamma^2 C_1 C_m\right)}{1-\gamma^2 C_1 C_m - \delta^2}, \tag{1}$$

and

$$e_c = \frac{C_m\left(\gamma\lambda_1 C_1 - \delta\right)}{1-\gamma^2 C_1 C_m - \delta^2}. \tag{2}$$

The equilibrium effort for the salesperson is

$$e_1 = C_1\left(\lambda_1 + \gamma\frac{C_m\left(\gamma\lambda_1 C_1 - \delta\right)}{1-\gamma^2 C_1 C_m - \delta^2}\right). \tag{3}$$

Interestingly, I find

$$e_s + \delta e_c = C_m, \tag{4}$$

which says the total of selling effort and the product of cost conflicting coefficient and coaching effort equals manager's commission rate, C_m. Another observation is the more effective the manager is at coaching, i.e. the larger γ is, the more coaching effort the manager will provide to the team. Because of (4), the manager will cut selling effort correspondingly, if $\delta > 0$; will also increase selling effort, if $\delta < 0$. The higher commission rate salesperson is getting, the more coaching the manager will provide. If the salesperson is very much motivated to sell, the manager's help would be a huge boost to the team's total sales.

> ***Proposition 1:*** If selling and coaching are conflicting ($\delta > 0$), the manager will coach more and sell less if γ increases and/or C_1 increases. Conversely, the manager will coach less and sell more if the reverse is true.

The influences of γ can be intuitively understood by the basic rule that people do their specialized activities to bring maximized utilities. The impact of salesperson's commission rate for the manager is not that obvious. In this cooperative game, when C_1 increases, the salesperson is more motivated, and the manager will take advantage of this highly motivated salesperson and provide more coaching to them.

3.2.1 Model of Coaching with Inequity Aversion

Now I incorporate a specific kind of other-regarding preferences, inequity aversion, to both the manager and salesperson on top of the simple model. In this unfairness model, I consider a common situation when the salesperson is getting higher commission rates than the manager. This unfairness/inequity is perceived as disadvantageous (advantageous) from the perspective of the manager (salesperson). The manager feels envy, i.e. disadvantageous inequity aversion, and the salesperson feels guilt, i.e. advantageous inequity aversion towards the difference. Let us refer to the degree to which the manager dislikes this disadvantageous inequity as "envy," denoted by α, and the degree to which the salesperson dislikes this advantageous inequity as "guilt", denoted by β_1. Noting that salaries are usually private information in the real world for salespeople, I just enable the inequity aversion with respect to commission rate, but not salary in this essay.

Therefore, the certainty equivalent of manager with his disutility of envy becomes

$$CE_m = S_m + \left(C_m - \alpha\left(C - C_m\right)\right)\left[e_s + \lambda_1 e_1 + \gamma e_c \cdot e_1\right] - \frac{1}{2}{e_c}^2 - \frac{1}{2}e_s^2 - \frac{1}{2}r\left(C_m - \alpha\left(C - C_m\right)\right)^2,$$

and the certainty equivalent of salesperson with his disutility of guilt becomes

$$CE_1 = S_1 + \left(C_1 - \beta_1\left(C_1 - C_m\right)\right)\left[e_s + \lambda_1 e_1 + \gamma e_c \cdot e_1\right] - \frac{1}{2}e_1^2 - \frac{1}{2}r_1\left(C_1 - \beta_1\left(C_1 - C_m\right)\right)^2.$$ All

others remain unchanged. For simplicity, let us define the adjusted commission rate for the manager as $C_m' = (C_m - \alpha(C_1 - C_m))$, and for the salesperson as $C_1' = (C_1 - \beta_1(C_1 - C_m))$. Note that the adjusted commission rates depend on envy α and guilt β_1 respectively. Without going to details of derivations, the partial equilibrium results are summarized in Appendix 1.

The coaching and selling efforts of the manager are

$$e_s^* = \frac{C_m'(1 - \delta\gamma\lambda_1 C_1' - \gamma^2 C_1 C_m')}{1 - \gamma^2 C_1' C_m' - \delta^2}, \tag{5}$$

and

$$e_c^* = \frac{C_m'(\gamma\lambda_1 C_1' - \delta)}{1 - \gamma^2 C_1' C_m' - \delta^2}. \tag{6}$$

and team member's selling effort is

$$e_1^* = C_1'\left(\lambda_1 + \gamma\frac{C_m'(\gamma\lambda_1 C_1' - \delta)}{1 - \gamma^2 C_1' C_m' - \delta^2}\right) \tag{7}$$

Similar to the plain-vanilla model, we can see $e_s^* + \delta e_c^* = C_m'$. The difference is the commission rates are adjusted by the envy and guilt. Both the manager and salesperson perceive lower commission rates if their envy and guilt are non-negative, i.e., the manager feels envy and the salesperson feels guilt.

First, it is interesting to see how e_1^* depends on the guilt aversion β_1. By taking the first derivative of e_1^* with respect to β_1, I have

$$\frac{\partial e_1}{\partial \beta_1} = -(C_1 - C)\frac{(1 - \delta^2)(\lambda_1(1 - \delta^2) - \gamma\delta C') + \lambda_1\gamma^3 C_1' C'(\gamma C_1' C' - 1)}{(1 - \gamma^2 C_1' C' - \delta^2)^2}. \tag{8}$$

If $C_1 > C_m$ and $\beta_1 > 0$, as β_1 increases, the adjusted commission rate for the salesperson C_1' decreases, and thus manager's coaching effort decreases (the numerator of (6)

decreases and the denominator of (6) increases). From (7), salesperson's selling effort decreases as well. This is true when the salesperson feels guilty about the advantageous inequity, which is remained to be an empirical question in the field.

> ***Proposition 2***: If $C_1 > C_m$ and $\beta_1 > 0$, as the guilt (disadvantageous inequity aversion) goes up, the manager's equilibrium coaching effort decreases and thus salesperson's equilibrium selling effort decreases.

Second, from the perspective of the manager, the coaching effort depends on all the factors in the simple model plus envy. In salesforce, a typical point of view is that salespeople take any advantage for granted, but feel pretty strong about any disadvantage. Under this assumption, the manager has a positive disadvantageous inequity aversion, $\alpha > 0$. By taking the first derivative of equilibrium coaching effort w.r.t. envy, I have

$$\frac{\partial e_c^*}{\partial \alpha} = -\frac{(\gamma\lambda_1 C_m' - \delta)(1-\delta^2)(C_1 - C_m)}{(1-\gamma^2 C_1' C_m' - \delta^2)^2}. \tag{9}$$

Third, the equilibrium coaching effort can increase with envy, as long as efforts are non-negative and (10) is satisfied (Appendix). Intuitively, if the team manager is compensated at a lower commission rate than the salesperson, she might feel envy and thus is not likely to help the salesperson. However, this is not true under the circumstance as specified in (10). If the manager is rational utility maximizer with a feeling of inequity aversion of α, she is better off by helping rather than not helping, which is the instinctively emotional response.

$$1 - \gamma^2 C_1' C_m' < \delta\gamma\lambda_1 C_1' < \delta^2 < 1 \text{ and } C_1 - C_m > 0 \tag{10}$$

Similar to the simple model, $e_s^* + \delta e_c^* = C_m'$, which depend on envy. As α goes up, the adjusted commission rate perceived by the manager, C_m' goes down.

The parameter α captures the sense of inequity that the manager feels when the commission rate of the salesperson exceeds his, even though he is responsible for training the salesperson to be better. What happens to the amount of coaching selected by the manager as the disadvantageous inequity aversion α intensifies? The directional response is conditional on the sales situation but details can be elaborated from the above coaching effort formula, namely:

> ***Proposition 3***: If $1-\gamma^2 C_1' C_m' < \delta\gamma\lambda_1 C_1' < \delta^2 < 1$ and $C_1 > C_m$ ($\alpha > 0$), as the envy (advantageous inequity aversion) goes up, the manager's equilibrium coaching effort goes up.

As the manager becomes more averse to the unfairness-the difference of salesperson's commission rate and his own commission rate, whether the manager should increase coaching effort or not depends on a trade-off among many factors, both rational and irrational factors. These rational factors include the manager's selling and coaching capability (γ), the salesperson's selling capability (λ_1), and conflicting coefficient between selling and coaching (δ), commission rates (C_m and C_1). The irrational factors are envy (α) and guilt (β). When the envy and guilt are sufficient enough, it is the best interest for the manager to provide more help to the salesperson, even though the salesperson enjoys favor of higher commission rate than him. In short, the more envious the manager is, the more help he will provide under some circumstance.

So what will the firm do if they can know the manager and salesperson's inequity aversion? Will this interesting result still hold? Next, I show that this interesting phenomenon will disappear with endogenous commission rates.

The expected profit of the firm is calculated as the expected sales minus expected salary and commissions for the manager and the salesperson. Since the noise term is normally distributed with a mean of 0 and variance of 1, I have it as:

$$E\Pi = (1-(\alpha+\beta_1)(C_1-C))(e_s+\lambda_1 e_1+\gamma e_1 e_c)- \left(\frac{1}{2}e_c^2+\frac{1}{2}e_s^2+\delta e_s e_c+\frac{1}{2}rC'^2\right)-\left(\frac{1}{2}e_1^2+\frac{1}{2}r_1 C_1'^2\right). \quad (11)$$

> ***Proposition 4***: Inequity aversion hurts the firm's profit. If a profit-maximizing firm realizes the inequity aversion of salespeople, the firm can minimize the loss of profit by giving equal commission rates to the manager and salesperson in the same team.

I have shown in Table 1 that, once the firm has complete information of inequity aversion of salespeople, the commission rates will be chosen endogenously so that the unfairness will not happen in the first place. The underlying reason is that inequity hurts the firm's profit by introducing this particular form of other-regarding preferences, i.e. fairness or inequity to the agents-the manager and the salesperson. Therefore, inequity aversion not only reduces effectiveness of salespeople but also the profit at the firm level.

Table 1 Equilibrium Coaching Effort with Endogenous Commission Rates

e_c		r= .1				r= .4				r= .7				r=1			
		α				α				α				α			
γ	δ	0.1	0.4	0.7	1	0.1	0.4	0.7	1	0.1	0.4	0.7	1	0.1	0.4	0.7	1
0.4	0.1	0.30	0.30	0.30	0.30	0.17	0.17	0.17	0.17	0.10	0.10	0.10	0.10	0.06	0.06	0.06	0.06
	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0.95	0.79	0	0	0.89	0	0	0	0.86	0	0	0	0.85	0	0	0
1.6	0.1	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
	0.4	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
	0.7	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1	0	0	0	0	0.08	0.08	0.08	0.08	0.31	0.31	0.31	0.31	0.39	0.39	0.39	0.39
2.8	0.1	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
	0.4	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.03	0.03	0.03
4	0.1	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
	0.4	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
	0.7	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.3 Guidance Model

Besides selling and coaching, another important decision for the team manager is how to provide guidance to its sales team. The sales team might be selling a product with multiple attributes and don't know which attribute is more preferable to the customer. Or the sales team might be selling a solution to the customer which is composed of multiple products. The former scenario applies to a more dedicated team who is selling a single but complex product, such as complex industry equipment in oil and gas and medical industry. It is easy to get distracted by so many attributes of the complex product and the manager can help the team by pointing a direction under limited resources and time. It is critical for the manager to explicit tell the whole sales team which attribute is more important than the other. As the managers learn more of the customer's needs, they might

be able to narrows down the range of customers' preferences. The latter scenario is more suitable to the case of key account sales teams where the key account manager has to first understand and analyze the customer's needs and then decide which product is more important. The role of guidance is critical for key account manager because they are the conduit between the selling and the buying organization and only they would know this information, since it takes a long time to accumulate the experience and skills to do this job well. I would like to contribute to this line of literature by providing an analytical model devoted the special role of manager, namely guiding. The purpose is to generate some insight of how manager's guiding decision is made and how unfairness would impact it.

To make this simple, I assume the team manager sells product 1 and 2 and has a limited of resources to use. For easy reference, I now refer team manager by she or her and the salesperson by he or him. These resources include time, energy, and capital etc. and are in aggregate parameterized by μ. The manager sells to a single customer and he has to decide which product has the priority over the other. She needs to determine how important product 1 is to the customer, φ_1, versus how important product 2 is to the customer, φ_2. The more important the product, the more effective time is devoted to it. Alternatively, this product 1 and 2 could be attributes of a single product so that φ_1 and φ_2 are part-worth coefficients of the attributes, à la Fishbein and Ajzen (1975) and conjoint analysis. In either case, these are the marginal effects of two types of sales efforts. The common theme here is that the manager takes time to learn customer's preferences or needs and then makes a critical decision to guide the team's direction-

which type of sales effort is more important. I will just use the decision weighing the importance of two products to illustrate the idea.

Without any prior effortful investigation, she only knows that the customer's preference for the product i, φ_i, lies between 0 and 1. By exerting to investigate the customer's needs, she can have a better prediction of the customers' true needs. Suppose the customer's true preference for product i is θ_i, which ranges from a narrower window than [0,1]. Let us assume the true preference is uniformly distributed as $\theta_i \sim Unif[\theta_i-\delta, \theta_i+\eta]$.

The manager can narrow the predicted range by exerting effort, such as talking to the customer, identifying their problems, proposing and revising solutions. The more effort the manager spends with the customer, the closer he is to the true preference. However, depending on the manager's expertise, he may be good or bad at knowing what is needed by the customer vs. what is not needed. I refer the manager's ability to identify needs m_1 and that to exclude non-wanted needs m_2. Therefore, by exerting effort e_m, the manager can have a guess of customer i's need of product i, $\varphi_i \sim U[m_1 e_m, 1-m_2 e_m]$ (Figure 1).

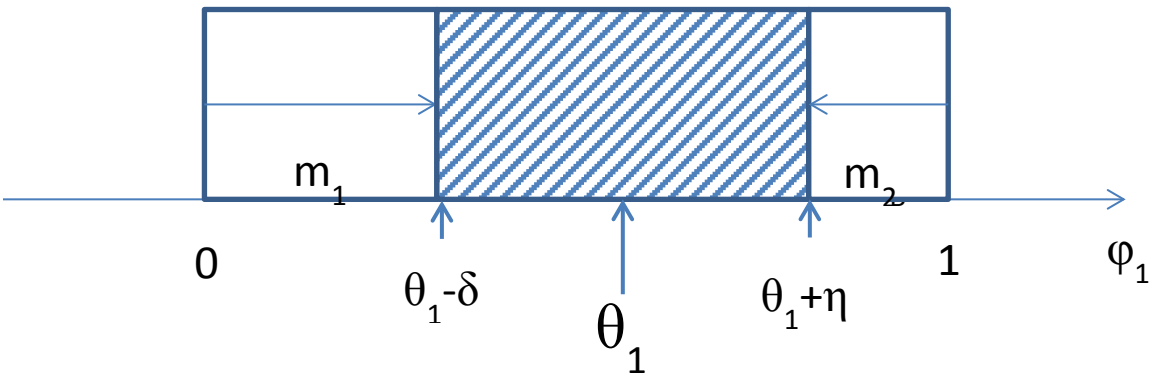

Figure 1 Manager's guidance model-part worth coefficient φ_1

The total sales of the team are a combination of two accounts, depending on how much effort product specialists choose, and how effective the manager is at providing guidance. In this model of guidance, the manager's role is simplified to be providing guidance to and navigate products specialists, and the specialists' role is serving the customers' by utilizing their special knowledge about product i. The total sales is $TS = \varphi_1 e_{1`} + (\mu - \varphi_1) e_2$.

The expected utility of salesperson i is $EU_i = S_i + C_i(\varphi_1 e_1 + (\mu - \varphi_1) e_2) - \frac{1}{2} e_i^2$.

Suppose $S_1 = S_2 = S$, $C_1 = C_2 = C$. The expected utility of the manager is

$EU_m = S_m + C_m(\varphi_1 e_1 + (\mu - \varphi_1) e_2) - \frac{1}{2} e_m^2$. One solves the Nash equilibrium in the guidance model by taking the first order conditions for tall team members simultaneous. This gives the team manager's guidance effort:

$$e_m^* = \frac{C_m C(1-\mu)(m_1 - m_2)}{1 - C_m C(m_1 - m_2)^2} \tag{12}$$

To ensure this is maximized solution, I check the second order to make sure it is negative: $\frac{\partial^2 EU_m}{\partial e_m^2} = C_m C(m_1 - m_2)^2 - 1 < 0$. This implies the numerator of (12) is positive. To ensure the manager's effort is positive, i.e., $e_m^* > 0$, there are two separate conditions. If $\mu < 1$, the marginal capability of identifying specific needs for product 1 must be greater than that of eliminating needs for product 2, i.e., $m_1 \geq m_2$; If $\mu > 1$, the marginal capability of identifying specific needs for product 1 must be less than or equal to that of eliminating needs for product 2, i.e., $m_1 \leq m_2$.

3.3.1 Model of Guidance with Inequity Aversion

Similar to the coaching model with inequity aversion in section 3.2.1, if the manager feels different commission rates are unfair, the equilibrium effort for the manager becomes

$$e_m^{*\prime} = \frac{C_m' C(1-\mu)(m_1 - m_2)}{1 - C_m' C(m_1 - m_2)^2}, \tag{13}$$

where $C_m' = C_m - \alpha(C - C_m)$, the adjusted commission. As the inequity aversion goes up, the inequity-adjusted commission rate for the manager, C_m', decreases, and the equilibrium guidance effort for the manager decreases. However, the division of salespeople' effort depends.

$$e_1^* = C\frac{1 + (m_1 - m_2)e_m^*}{2} \tag{14}$$

$$e_2^* = C\frac{2\mu - 1 - (m_1 - m_2)e_m^*}{2} \tag{15}$$

Proposition 5: If $m_1 > m_2$, $\mu < 1$, as the manager's inequity aversion goes up, the manager's effort to guide the team diminishes, the effort for salesperson 1 decreases, and that for salesperson 2 increases.

If it is easier for the manager to tell if the customers like the product than does not like the customers, equivalently, the expected value of the customers' preference towards product 1 is greater than half, i.e., the customer likes product 1 more than product 2. In this coordinated game, as the manager's inequity aversion goes up, manager will reduce his effort and salesperson 1 will mimic the manager's shirking. And the reverse is true for salesperson 2.

4 Discussion and Conclusion

Rarely do I see analytical work in the academic filed of marketing on this issue. I attempt to quantitatively study a sales team that requires interactional activities between the manager and salespeople and demonstrate the potential risk of unfair compensation. As an illustration, inequity aversion can be triggered by unequal commission rates between the manager and the salesperson, and its corresponding hazard might include emotional feelings such as envy and guilt. These feelings are modeled as disadvantageous and advantageous inequity aversion in a team selling context and can adversely impact on both manager's and salesperson's effectiveness. From the perspective of salespeople, inequity aversion makes them shirk and thus the team becomes less productive. Within the sales team, turbulence can occur due to this low morale. It will make both the manager and the salesperson better off reducing their effort levels. However, for the manager, whether he exerts more or less coaching effort will depends. When the disadvantageous inequity aversion is sufficiently large, he might still want to help the salesperson to excel at selling. Unfortunately, no matter what, as long as the inequity aversion arises, it will hurt the firm's profit. Therefore, the firm will be better off setting up optimal commission rates and thus alleviating or even prohibit unfairness in sales team compensation.

Unfairness not only influences effectiveness and efficiencies of sales team, but also the directional effort of the manager, or Key Account Manager (KAM). In key account sales team, a special form of sales team, KAMS share some characteristics of sales people and some characteristics of middle level managers. They must devote time and attention to communicating and problem solving with the client accounts, but must

also guide, train, coordinate and help other team members perform specialized tasks such as customer service and logistics.

One contribution of the research is to develop a theory based on two models. The first model, coaching model, provides insight into how team managers can divide their efforts between coaching team members and selling clients. The second model, guidance model, quantifies the importance of team managers' guidance and provides managerial implications. As far as I know, this is be the first analytical study on team managers' tradeoff of coaching and selling and KAMs' guidance in sales teams. In contrast with organizational citizenship behavior as extra-role, this essay focuses on the within-role coaching, which may pay dividends for the firm that has created key account teams. Team selling has an economic cost advantage due to salespeople's helping team-selling behavior or Organizational Citizenship Behaviors (OCB), but a psychological cost disadvantage due to salespeople's reaction to unfairness. Despite the popularity of topics of fairness and OCB in academic research, to the best of the author's knowledge, analytic sales models have not incorporated them and studied the consequences for the sales team. This study will modify the traditional principal-agent model of sales to incorporate both OCBs and unfairness in a key account sales team.

Second, a managerial contribution is to explore how the firm can guide the division of effort through compensation systems. Selling teams may be more effective when they work together in a coordinated fashion, but the consequences of the joint activities cannot be attributed to specific team members. The team members may understand who is really primarily responsible for garnering sales from the client, but the firm may pay equal amounts to all. This can create a feeling that the compensation is not

tied to true merit and as a result demotivate some selling activities. In a recent compensation survey conducted by ZS Associates (SAMA, 2010) over 60% of strategic account managers feel team compensation was not driving team behavior well. One of the potential problems cited most often in this survey is that top performers felt that they are not clearly differentiated among the others in terms of compensation.

A third contribution of the research is to develop a theory based upon beliefs about the fairness/unfairness of the compensation. It specifies conditions under which leaders shift their emphasis between coaching and selling and specialists exert more or less effort. As Moorman and Albrecht (2008) write "In team-selling situations, the deployment strategy can be leveraged to significantly improve team coordination and shared accountability", I would like to help key account teams improve team coordination by balancing leaders' different roles such as coaching and selling, allocating time among different accounts.

Admittedly, being an analytical work itself has its own limitation of too much abstract. Practitioners might benefit from further studies of interviews and surveys with a large number of team selling salespeople, and more particularly, who are in key account sales teams. Another extension of this analytical work would be testing the implications in laboratory experiments and field studies.

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Appendix

Coaching Model Derivations

Using the standard assumption that the salespeople are usually constant absolute risk-averse (CARA), the certainty equivalent (CE_m) of the manager can be written as

$$\begin{aligned} CE_m &= S + \left(C - \alpha\left(C_1 - C\right)\right)\left[e_s + \lambda_1 e_1 + \gamma e_c \cdot e_1\right] \\ &- \frac{1}{2}e_s^2 - \frac{1}{2}e_c^2 - \delta e_s e_c - \frac{1}{2}r\left(C - \alpha\left(C_1 - C\right)\right)^2. \end{aligned} \tag{16}$$

Correspondingly, the team member's certainty equivalent (CE_1) is

$$CE_1 = S_1 + \left(C_1 - \beta_1\left(C_1 - C\right)\right)\left[e_s + \lambda_1 e_1 + \gamma e_c \cdot e_1\right] - \frac{1}{2}e_1^2 - \frac{1}{2}r_1\left(C_1 - \beta_1\left(C_1 - C\right)\right)^2. \tag{17}$$

To solve for the Nash equilibrium, I take the first order conditions of CEs w.r.t. manager's selling and coaching efforts (e_s, e_c) and team members' selling effort (e_1)

$$\frac{\partial CE_m}{\partial e_s} = C - \alpha\left(C_1 - C\right) - e_s - \delta e_c = 0, \tag{18}$$

$$\frac{\partial CE_m}{\partial e_c} = \left(C - \alpha\left(C_1 - C\right)\right)\gamma e_1 - e_c - \delta e_s = 0, \tag{19}$$

$$\frac{\partial CE_1}{\partial e_1} = \left(C_1 - \beta_1\left(C_1 - C\right)\right)\left(\lambda_1 + \gamma e_c\right) - e_1 = 0. \tag{20}$$

And I solve for (18) (19) (20) simultaneously as

$$\begin{bmatrix} 1 & \delta \\ \delta & 1 - \gamma^2\left[C_1 - \beta_1\left(C_1 - C\right)\right]\left[C - \alpha\left(C_1 - C\right)\right] \end{bmatrix}\begin{bmatrix} e_s \\ e_c \end{bmatrix} = \begin{bmatrix} C - \alpha\left(C_1 - C\right) \\ \gamma\lambda_1\left[C_1 - \beta_1\left(C_1 - C\right)\right]\left[C - \alpha\left(C_1 - C\right)\right] \end{bmatrix}. \tag{21}$$

Let $C' = C - \alpha\left(C_1 - C\right)$, $C_1' = C_1 - \beta_1\left(C_1 - C\right)$ and the manager's selling effort and coaching effort are

$$\begin{bmatrix} e_s \\ e_c \end{bmatrix} = \begin{bmatrix} 1 & \delta \\ \delta & 1-\gamma^2 C_1'C' \end{bmatrix}^{-1} \begin{bmatrix} C' \\ \gamma\lambda_1 C_1'C' \end{bmatrix} = \frac{C'}{1-\gamma^2 C_1'C'-\delta^2} \begin{bmatrix} 1-\delta\gamma\lambda_1 C_1'-\gamma^2 C_1 C' \\ \gamma\lambda_1 C_1'-\delta \end{bmatrix}. \tag{22}$$

and team member's selling effort is

$$e_1 = C_1' \left(\lambda_1 + \gamma \frac{C'(\gamma\lambda_1 C_1'-\delta)}{1-\gamma^2 C_1'C'-\delta^2} \right) \tag{23}$$

From (22), I can see $e_s + \delta e_c = C'$. As α increases, the adjusted commission rate for the manager decreases, as long as both the efforts and the conflicting factor δ are non-negative.

To let the coaching effort increase with inequity aversion, it has to satisfy both the non-negativity of (22) and the following condition

$$\frac{\partial e_c}{\partial \alpha} = -\frac{(\gamma\lambda_1 C'-\delta)(1-\delta^2)(C_1-C)}{(1-\gamma^2 C_1'C'-\delta^2)^2}. \tag{24}$$

It will be interesting to see how e_1 depends on the guilt aversion β_1.

$$\frac{\partial e_1}{\partial \beta_1} = -(C_1-C)\frac{(1-\delta^2)(\lambda_1(1-\delta^2)-\gamma\delta C') + \lambda_1\gamma^3 C_1'C'(\gamma C_1'C'-1)}{(1-\gamma^2 C_1'C'-\delta^2)^2} \tag{25}$$

The parameters that make coaching increases with the inequity aversion must satisfy all of the following:

$$1-\gamma^2 C_1'C'-\delta^2 < 0, \tag{26}$$

$$\gamma\lambda_1 C_1'-\delta < 0, \tag{27}$$

$$1-\delta\gamma\lambda_1 C_1'-\gamma^2 C_1'C' < 0, \tag{28}$$

$$1-\delta^2 > 0. \tag{29}$$

$$C_1 - C > 0 \tag{30}$$

It can be simplified as

$$1 - \gamma^2 C_1' C' < \delta\gamma\lambda_1 C_1' < \delta^2 < 1 \,\&\, C_1 - C > 0 \tag{31}$$

Since the noise term is normally distributed with a mean of 0 and variance of 1, I have the expected profit as the expected sales minus expected salary and commissions for manager and team member:

$$\begin{aligned} E\Pi = {} & \left(1 - (\alpha + \beta_1)(C_1 - C)\right)\left(e_s + \lambda_1 e_1 + \gamma e_1 e_c\right) - \\ & \left(\frac{1}{2}e_c^2 + \frac{1}{2}e_s^2 + \delta e_s e_c + \frac{1}{2} r C'^2\right) - \left(\frac{1}{2}e_1^2 + \frac{1}{2} r_1 C_1'^2\right) \end{aligned} \tag{32}$$

Plug (22) and (23) into (32), I could have expected profit in terms of C and C_1 only, as

$$\begin{aligned} E\Pi = {} & \left(1 - (\alpha + \beta_1)(C_1 - C)\right)\left[\frac{C'\left(1 - \delta\gamma\lambda_1 C_1' - \gamma^2 C_1 C'\right)}{1 - \gamma^2 C_1' C' - \delta^2} + C_1'\left(\lambda_1 + \gamma\frac{C'\left(\gamma\lambda_1 C_1' - \delta\right)}{1 - \gamma^2 C_1' C' - \delta^2}\right)^2\right] \\ & - \frac{1}{2}\left(\frac{C'\left(1 - \delta\gamma\lambda_1 C_1' - \gamma^2 C_1 C'\right)}{1 - \gamma^2 C_1' C' - \delta^2}\right)^2 - \frac{1}{2}\left(\frac{C'\left(\gamma\lambda_1 C_1' - \delta\right)}{1 - \gamma^2 C_1' C' - \delta^2}\right)^2 \\ & - \delta\frac{C'\left(1 - \delta\gamma\lambda_1 C_1' - \gamma^2 C_1 C'\right)}{1 - \gamma^2 C_1' C' - \delta^2}\frac{C'\left(\gamma\lambda_1 C_1' - \delta\right)}{1 - \gamma^2 C_1' C' - \delta^2} - \frac{1}{2} r C'^2 \\ & - \frac{1}{2}\left(C_1'\left(\lambda_1 + \gamma\frac{C'\left(\gamma\lambda_1 C_1' - \delta\right)}{1 - \gamma^2 C_1' C' - \delta^2}\right)\right)^2 - \frac{1}{2} r_1 C_1'^2 \end{aligned} \tag{33}$$

Because there is no closed form solution due to the complexity function of expected profit, let's shift to numerical simulation. I run a grid search using macros in Excel. On the assumption that $\beta_1 = 0$, I maximize expected profit as specified in (33) by allowing the solver to choose optimal C_m and C_1, while varying risk aversion r, envy (disadvantageous inequity aversion) α, coaching capability coefficient γ, conflicting coefficient δ at four different levels. The equilibrium coaching effort is given in the table below.

ESSAY 2

UNFAIRNESS IN SALES TEAMS: AN EXPERIMENTAL INVESTIGATION

1. Introduction

Unfairness in sales force compensation is a very challenging problem in global sales organizations. Sales executives found a growing number of complaints of unfair compensation from field salespeople, as recently discovered by hordes of leading consultants on sales compensation (Zoltners 2013). This is more prominent in global sales organizations because the unfairness can have a devastating effect in sales teams. Salespeople are heterogeneous in selling capabilities but the compensation might be common for everyone in the sales team. While some salespeople think it is alright to get same compensation plan as someone less competent, others might think it is totally unfair to them. That is, salespeople are heterogeneous in perceptions of fairness. Although it might not be that critical if the compensation is based on individual performance, it is a headache when the compensation is based on team performance, as predominantly adopted by global sales organizations. For them, the issues of heterogeneous perceptions of unfairness, combined with free-riding, measurability of salespeople's efforts, and the difficulty of identifying the causality of effort-performance relationship, makes the compensation an enormous problem. When salespeople perceive they are not compensated fairly, they become less motivated, get slack, destroy morale, kill teamwork, or even worse, quit. Team-based compensations become a double-edge sword. Although the intention was to increase efficiency and effectiveness, encourage collaboration, stimulate team work, it might turn out to be exact opposite with an unfair compensation.

Despite the pressing demand for a fair compensation in the sales practitioners, very limited analytical and experimental work is directly devoted to it. The extant theoretical and experimental literature on sales force compensation has focused on

examining three issues. First, majority literature is analytical and most of them study optimal compensation on individual levels (Kim 1997; Oyer 2000; Joseph and Kalwani 1998; Steenburgh 2008; Chung, Steenburgh and Sudhir 2010; Lal and Srinivasan 1993; Mantrala, Sinha, and Zoltners 1994; Mantrala, Raman and Desiraju 1997; Raju and Srinivasan 1996). This line of literature started from seminal papers in various forms of compensation plans, such as tournament, bonus-quota, and commissions (Lazear and Rosen, 1981; Green and Stokey, 1983; Nalebuff and Stiglitz, 1983; Kalra and Shi, 2001). Second, some on teams, but not this fairness concerns (Kräkel 2008; Grund and Sliwka 2005; Chen, Ham and Lim 2011). Third, within those literature focus on fairness, the variety of topics include firms' pricing behavior (Kahneman Knetsch and Thaler 1986), distribution channel commitment (Anderson and Weitz, 1992) and coordination (Cui, Raju and Zhang, 2007; Ho, Su and Wu, 2013), etc. Only little work has been done so far that makes use of relative utility components in sales teams. Exceptions are the following papers. One is Grund and Sliwka (2005) and they investigate envy and compassion in tournaments where two agents are inequity averse to the wage difference under individual pay scheme. Another is Itoh (2004), who compares team contract and relative performance contract on the assumption that both agents and principal are risk neutral. While his interest is to select optimal contract forms for inequity-averse agents, our primary focus is how does inequity aversion influences agents' effort decisions. Most closely related to this essay, Rey-Biel (2008) is probably the only analytical paper that studies unfairness in team incentives. In his model, effort is observable and verifiable, which is very unlikely to be true in the context of team selling. While his paper focuses on the contract design of optimal quotas, I am more interested in a more common-to-see

situation, where commission rates for the manager and salesperson differs. Given that team manager is different than a single functioning salesperson, it is therefore critical to close the current theoretical gap in understanding how team manager and salesperson makes equilibrium effort decisions in a sales team with the realistic unfairness concerns.

Moreover, equilibrium predictions of effort choices in a sales team is rather complex, because it involves with multiple people's interaction and their inequity aversion. It is useful to empirically validate these predictions, particularly using laboratory behavioral economics experiments. Much of the extant experimental work on fairness investigates the predictions of the theoretical papers. The seminal paper Fehr and Schimidt (1999) stimulates numerous experimental works in inequity aversion (Cui, Raju and Zhang 2007; Falk, Fehr and Fischbacher 2008; Bellemare, Kroger and Soest 2008; Englmaier and Wambach 2010; Yang Onderstal and Schram 2014) in the past decades.

Although much of the experimental literature tests theories of inequity aversion, there is none purely devoted to a specific challenging question to the many sales executives in global sales organizations who largely employ team selling and widely use team-based incentives. I endeavor to a model that captures the essence of sales teams, who have different roles and responsibilities and different preferences for inequity.

This essay makes three contributions to the literature on designing optimal commission rates compensation plans. First, I use commission theory to examine how salesperson and team manager choose their effort. Second, I aggregately estimate both advantageous and disadvantageous inequity aversion. By manipulating the salaries and commission rates for the manager while holding those of salesperson as constant, I create four treatments with different degrees of inequity and thus are able to estimate both

inequity aversion. Third, I experimentally test two different forms of inequity aversion, one with respect to salaries, the other one with respect to commission rates. This allows us to diagnose which inequity is more disliked by salespeople. In reality salespeople who are pissed off by the unfair commission rate might shirk, and those who are pissed off by the unfair salaries might quit.

The essay proceeds as follows: Section 2 outlines the model of sales team on how inequity aversion impacts on their effort decisions and hypotheses for experimental testing. Section 3 explains the experiment design, procedure and presents with data and the analysis. Section 4 discusses the findings from the experimental data and the managerial implication of results.

2. Theory and Hypotheses

I analyze a model of a sales team, consisted of one manager and one salesperson. I make this simplification because I want to introduce unfairness in the simplest sales team that involves with interaction without too many complex factors. Admittedly, this model can easily be extended to one manager with multiple salespeople.

The total sales of the team is $TS = e_s + (\lambda_1 + \gamma e_c)e_1 + \varepsilon$, where manager's selling capability coefficient is normalized to be 1, λ_1 is the selling capability coefficients for salesperson 1, γ is the coaching coefficient of the manager, e_1 is salesperson 1's effort, and ε is the random component in sales with a Normal distribution of N(0, 1). The compensation is salary and commissions based on total team sales for both manager and salespeople. Both manager and salesperson are risk-averse, with a Constant Absolute Risk Aversion (CARA). They maximize their own utilities, which depend on their salary, commissions, cost, and risks. The commission rates given to manager and team member

are C_m and C respectively. Assume the manager is selling and coaching at same time and can choose how much time to spend in selling, e_s, and how much time to spend in coaching, e_c. Therefore, the cost structure of the manager is composed of two quadratic terms and an interaction term with a distracting factor of δ,

$\text{Cost}_m = \frac{1}{2}ke_s^2 + \frac{1}{2}ke_c^2 + \delta ke_s e_c$. The rationale is that coaching and selling can't occur at the same time, and how costly it is for the manager to do both selling and coaching depends on how good the manager is at multitasking at selling and coaching (the smaller δ is, the better). The selling cost of the salesperson is $\frac{1}{2}ke_1^2$.

In this unfairness model, I consider a common situation when the salesperson is getting higher commission rate and salary than the manager. This unfairness/inequity is perceived as disadvantageous (advantageous) from the perspective of the manager (salesperson). The manager feels envy, i.e. disadvantageous inequity aversion, and the salesperson feels guilt, i.e. advantageous inequity aversion towards the difference. Let us refer the degree to which the manager dislikes this disadvantageous inequity as "envy", denoted by α, and the degree to which the salesperson dislikes this advantageous inequity as "guilt", denoted by β_1. Since both salary and commission rate are separate reference points, I use α_s (α_c) to refer the envy for salary (commission rate), and β_{1s} (β_{1c}) to refer the guilt for salary (commission rate).

Since risk aversion is not the primary concern and it might interfere with inequity aversion, let's assume they are risk neutral and thus the risk terms in the certainty equivalents disappear. Therefore, the certainty equivalent of manager with his disutility of envy becomes, $\text{CE}_m = S - \alpha_s(S_1 - S) + (C_m - \alpha_c(C_1 - C_m)) \cdot TS - \text{Cost}_m$, where the

$\text{Cost}_m = \frac{1}{2}ke_s^2 + \frac{1}{2}ke_c^2 + \delta \cdot k \cdot e_s \cdot e_c$, and the certainty equivalent of salesperson with his disutility of guilt becomes $CE_1 = S_1 - \beta_{1s}(S_1 - S) + (C_1 - \beta_1(C_1 - C_m)) \cdot TS - \frac{1}{2}ke_1^2$.

Because I am interested in testing the theory in the experiment, it requires too much cognitive effort if I want those participants in the role of manager to do simultaneous decisions on coaching and selling. So I have decided to fix e_s at a constant level, say $e_s = \bar{e}_s$. And I solve for the equilibrium efforts (Appendices 1):

$$e_c^* = \frac{\frac{C_m^a C_1^a \gamma \lambda_1}{k^2} - \delta \bar{e}_s}{1 - \frac{C_m^a C_1^a \gamma^2}{k^2}} \tag{34}$$

$$e_1^* = \frac{C_1^a}{k}(\lambda_1 + \gamma e_c^*) \tag{35}$$

In addition, I want to consider a possible situation that the salesperson or the manager might quit. Suppose the second best job offers a salary and commission that is common for everyone in a team, so the certainty equivalent for comparison is:

$$CE_0 = S_0 + C_0 \cdot TS - \frac{1}{2}ke_0^2$$

Although I can use (34) and (35) to estimate the inequity aversion with respect to commission rates, i.e. α_c and β_{1c}, I could not tell if they have inequity aversion with respect to salaries, i.e. α_s and β_{1s}, because the effort decision do not depend on α_s and β_{1s}, as predicted by the theory. Therefore, I inform the participants the second best job offer in the experiment and would like to use logit model to estimate α_s and β_{1s} from their choices between the current job and the second best job.

In salesforce, a typical point of view is that salespeople take any advantage for granted, but feel pretty strong about any disadvantage. As for whether they care about salary and commission rate, I do not have prior hypotheses. Under this assumption, the manager has a positive disadvantageous inequity aversion, i.e. $\alpha_s > 0$ and/or $\alpha_c > 0$, but a zero advantageous inequity aversion, i.e. $\beta_{1c} = 0$ and/or $\beta_{1c} = 0$. In addition, I assumed that the manager and the salesperson share a common belief in each other's inequity aversion in the model. In summary, I would like to test the following hypotheses:

H_1: Envy towards the commission rate difference exists for the manager ($\alpha_c > 0$);

H_2: Guilt towards the commission rate difference exists for the salesperson, ($\beta_{1c} > 0$);

H_3: Manager and the salesperson have a common belief of the manager's envy towards the commission rate difference;

H_4: Manager and the salesperson have a common belief of the salesperson's guilt towards the commission rate difference;

H_5: Envy towards the salary difference exists for the manager ($\alpha_s > 0$);

H_6: Guilt towards the salary difference exists for the salesperson ($\beta_{1s} > 0$);

H_7: Manager and the salesperson have a common belief of the manager's envy towards the salary difference; and

H_8: Manager and the salesperson have a common belief of the salesperson's guilt towards the salary difference.

3. Laboratory Experiment

3.1 Experiment Design

I design a 2x2 between-subject experiment with two different levels of salary and two different levels of commission rates of team manager while holding salary and commission rate of the salesperson constant. I have chosen a set of parameters so that i) the equilibrium efforts for the manager and salesperson is a non-focal point between 0 to 30 in the case when manager's commission rate is lower than the salesperson's; ii) the equilibrium reaches to the ceiling when their commission rate is equivalent.

Under the parameters of the experiment, k=0.25, $\bar{e}_s = 1$, δ=0.2, γ=1, λ_1=1, the predicted equilibrium efforts by the model are:

Table 2 Model Prediction

Treatment	Salary Manager	Salary Salesperson	Commission Rate Manager	Commission Rate Salesperson	e_c^*	e_1^*
1	60	65	0.2	0.3	19	24
2	60	65	0.3	0.3	30	30
3	65	65	0.2	0.3	19	24
4	65	65	0.3	0.3	30	30

3.2 Experiment Procedure

Each of the four experimental sessions consisted of one of the four treatments, which has more than 20 subjects except the baseline treatment. Subjects were business undergraduates at a large public research university in the United States. They receive course credits for showing up the experiment on time and made earnings of credit based on their performance in the experiment. Each subject participated in 32 decision rounds in treatment 1-3 and 20 decision rounds in treatment 4.

The experimental procedure is based on those used in the extant experimental studies of fairness and team incentives (Falk, Fehr and Fischbacher 2008; Cui and Mallucci 2013; Lim and Chen 2014), but also differs in the following ways. As mentioned earlier, I am interested in the situation where a manager and a salesperson are compensated at different salaries and/or commission rates. This is closer to most team based compensation in the real world because of the followings. First, the manager usually has multiple roles including selling and coaching, the salesperson usually is only responsible for selling. Second, team-based compensation is used to stimulate interaction and collaboration among team members, but their salaries and commission rates might differ by each individual's qualifications. This is true for almost every sales organization where salespeople are heterogeneous in selling capabilities and manager are heterogeneous in selling and coaching capabilities. Third, in the real world team managers often are compensated by higher salary and lower commission rate than salespeople. I do not vary the salary of team managers to be higher than the salesperson because I want to focus on the commission rate comparison which happens more often in the real world where salaries usually are not common knowledge.

At the beginning of each session, I handed out the instructions that describe the decision tasks and the associated payment (Appendices 2). After five minutes or so of quiet reading, instructions are read aloud to the subjects by the experimenter. In each session, subjects are randomly assigned into the role of manager (Role A) or team member (Role B) from the first beginning and this role holds through the whole experiment session. The difference within each treatment is that the manager might have

lower or equal salaries and commission rate than the salesperson, as described in Table 2. The difference among four treatments is the manager's salary and commission rate.

In each treatment, both A and B are informed two sets of compensations, that is, salary and commission rates for both A and B are common knowledge. All subjects participate in 32 decision rounds (with one practice round without consequences to their final payment) in treatment 1-3 and 20 decision rounds in treatment 4. Every decision round, while their role as manager (A) or salesperson (B) are held, their partner are randomly selected from those people who are assigned into different roles to eliminate reciprocity. For both A and B, their task is to choose their own decision number from 0 to 30. These two decision numbers will determine the team total sales as follows, Team Total Sales $= 1 + \text{B's Decision Number} + \text{B's Decision Number} \times \text{A's Decision Number}$. They are also given the decision cost for each decision number they might choose (Table 3).

Their payment will be calculated by their own salary and the product of their own commission rate and Team Total net their own decision cost, as described in the Appendices 1 depending on the treatment condition (Table 2). One special thing here is that I offer all subjects an option of exit at the end of each round of the decision game, as I call payment scheme 1. In payment scheme 1, both A and B are compensated at an equal salary and commission rate based on a randomly determined team total sales and this number is the same across four treatments. It is notable the salary and commission rate in payment scheme 1 is the lower or equal to those in all four treatments. Therefore, the percentage of people who switch from payment scheme 2 to payment scheme 1 can

be used as a proxy as percentage of people who would like to quit and take the second best job offer.

Table 3 Decision Cost Table

Decision Number	A Your Decision Cost	B Your Partner's Decision Cost
0	0.13	0.00
1	0.30	0.13
2	0.73	0.50
3	1.40	1.13
4	2.33	2.00
5	3.50	3.13
6	4.93	4.50
7	6.60	6.13
8	8.53	8.00
9	10.70	10.13
10	13.13	12.50
11	15.80	15.13
12	18.73	18.00
13	21.90	21.13
14	25.33	24.50
15	29.00	28.13
16	32.93	32.00
17	37.10	36.13
18	41.53	40.50
19	46.20	45.13
20	51.13	50.00
21	56.30	55.13
22	61.73	60.50
23	67.40	66.13
24	73.33	72.00
25	79.50	78.13
26	85.93	84.50
27	92.60	91.13
28	99.53	98.00
29	106.70	105.13
30	114.13	112.50

3.3 Data Analysis

First, I plot the period-by-period effort decisions for all four treatments. In treatment 1, where it is most unfair to the manager A, A first tries to put high effort into coaching, but realizing it is useless to do so and then give up by reducing the coaching effort levels after round 18 or so (Figure 2). As soon as A shirks, B becomes very active in the team selling game and put into high level of effort in the hope of getting higher coaching effort from A as return. In the last 10 rounds, on average, B exerts higher effort than A, which is close to the theory prediction. Admittedly, there is a lot of variation in this treatment, because this is the first session that I run and the time has not be controlled very well so that some participants might have lost interests and are less engaged in the latter stage of the experiment. In treatment 2 (Figure 3), the average effort across all periods are consistently higher than treatment 1, and it is difficult to notice significant difference between A's and B's effort decisions. In Treatment 3 (Figure 4), B's effort are consistently higher than A's effort because they have higher commission rates. In Treatment 4 (Figure 5), most of A's efforts are higher than B's across all periods, which is in the same direction as predicted by the theory.

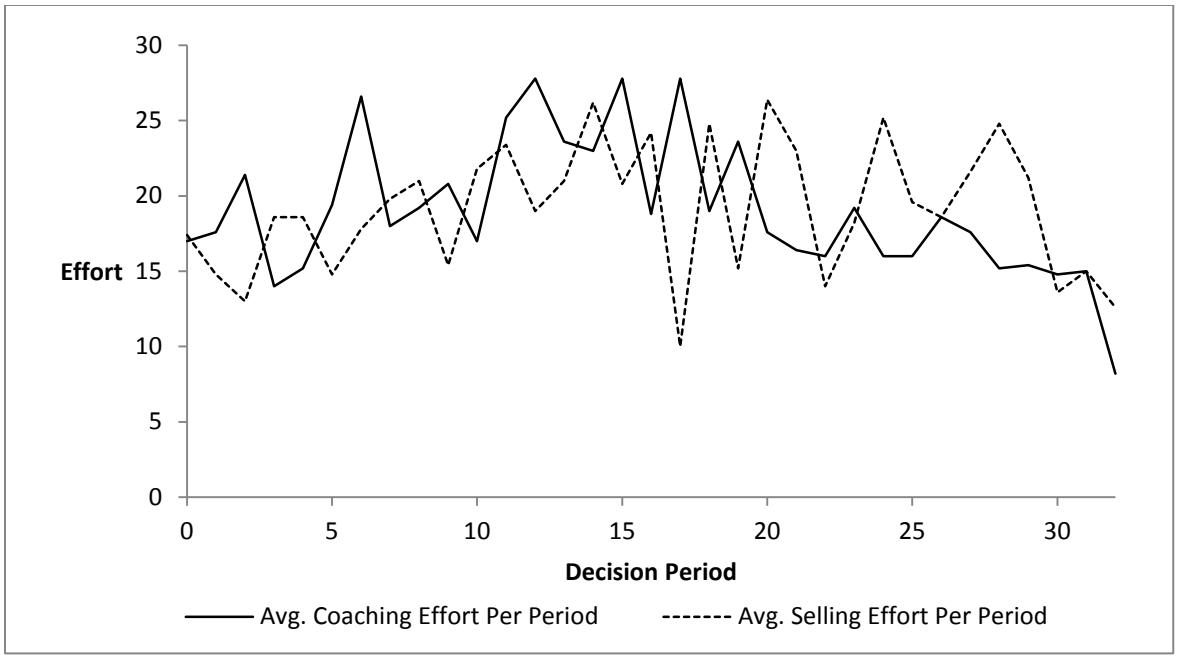

Figure 2
Efforts: Manager Low Salary and Low Commission Rate

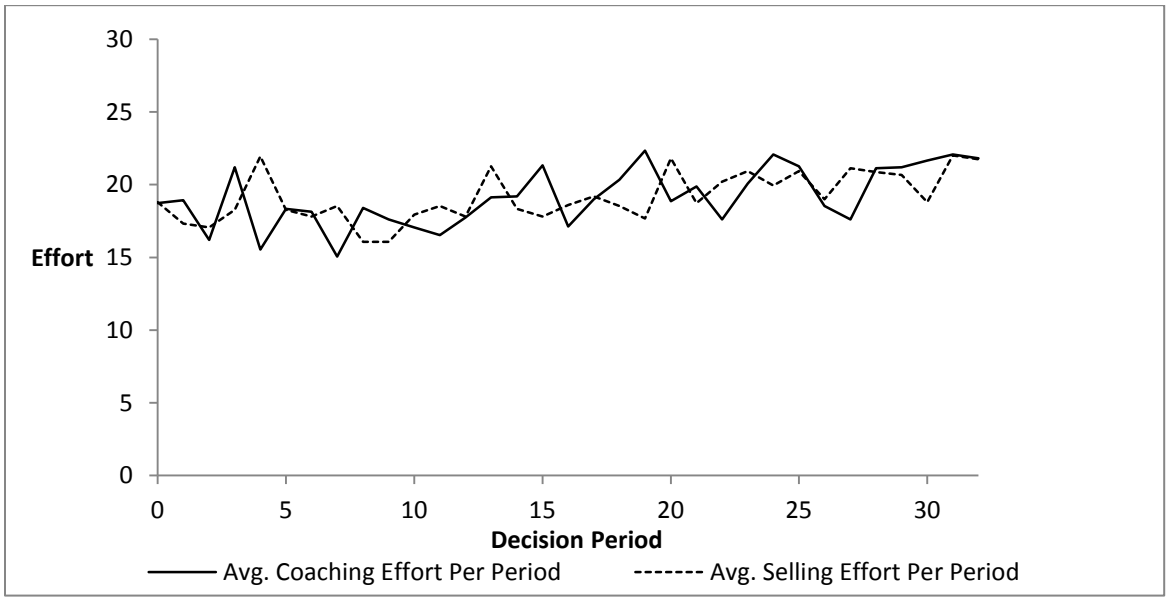

Figure 3
Efforts: Manager Low Salary and High Commission Rate

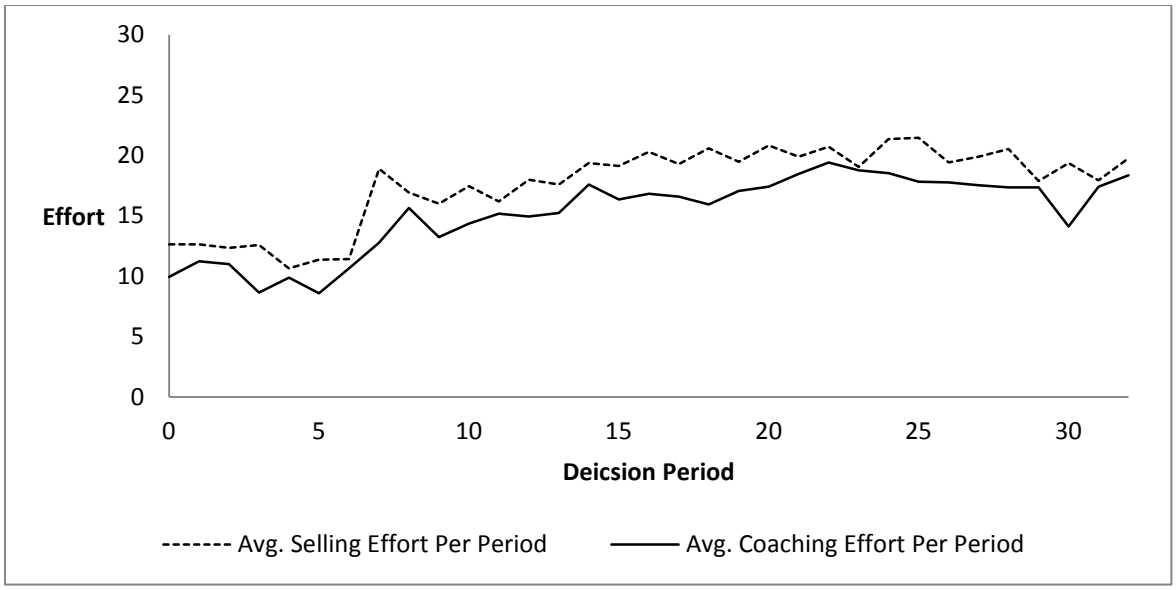

Figure 4
Efforts: Manager High Salary and Low Commission Rate

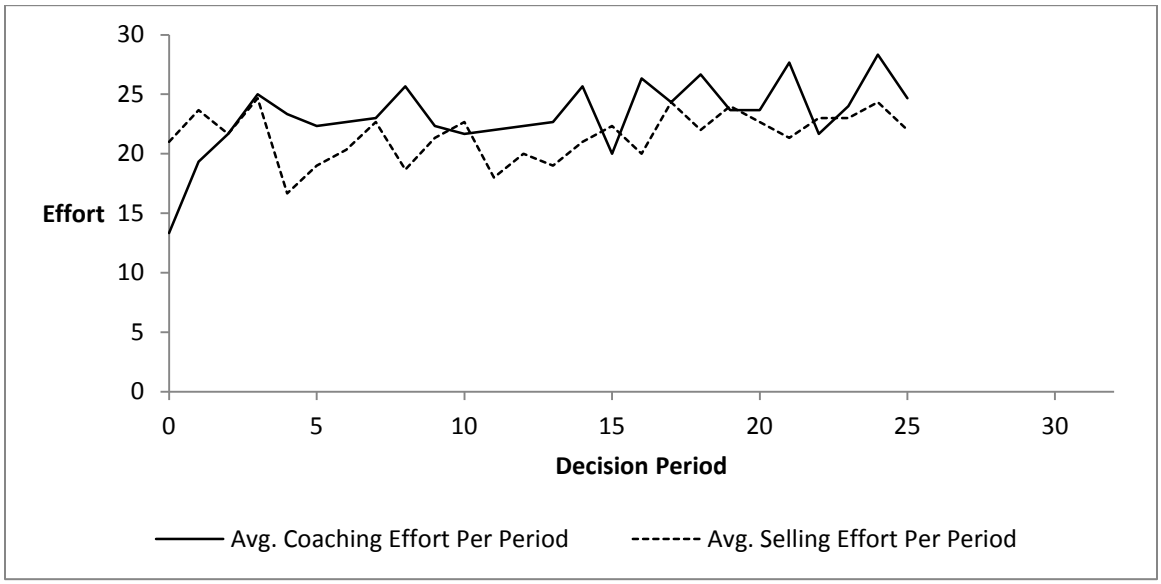

Figure 5
Efforts: Manager High Salary and High Commission Rate

Second, let us investigate if there is a pattern for switching. Treatment 1 through 4 has various degrees of unfairness and I expect to see most switching behavior in Treatment 1 and least switching behavior in Treatment 4. This is what I found in Figure 6.

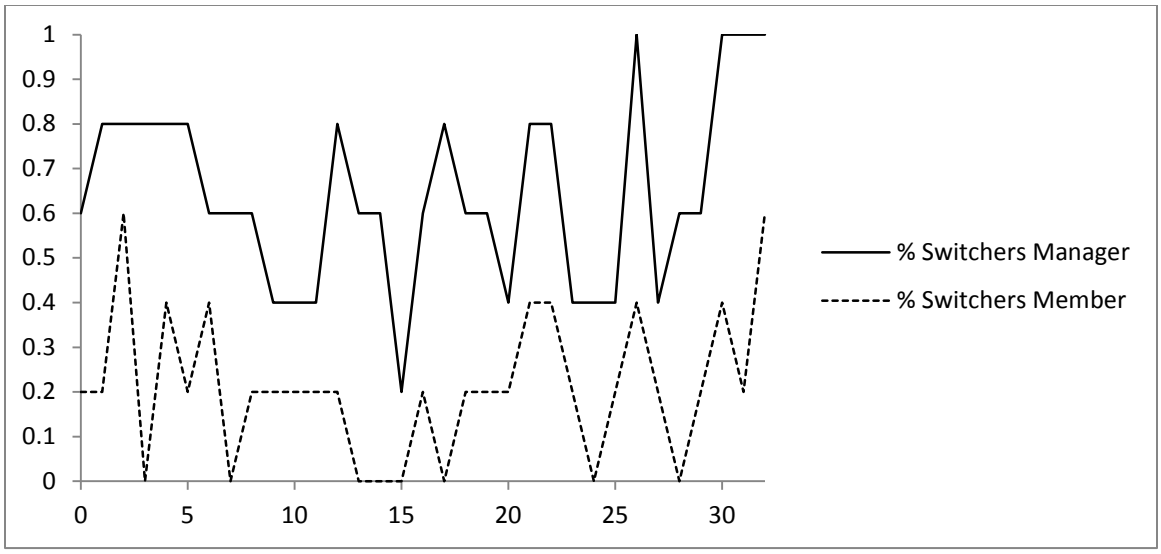

Figure 6 Percentage of Switchers-Treatment 1

On average, roughly 60% of A switches and 30% of B switches. And the percentage of people who opt in the second best job increases in the later stages of the treatment. In treatment 2 (Figure 7), where A's salary is lower but has equal commission rate as B, there is not any significant difference between A and B in switching and on average, 30% of A and B switch.

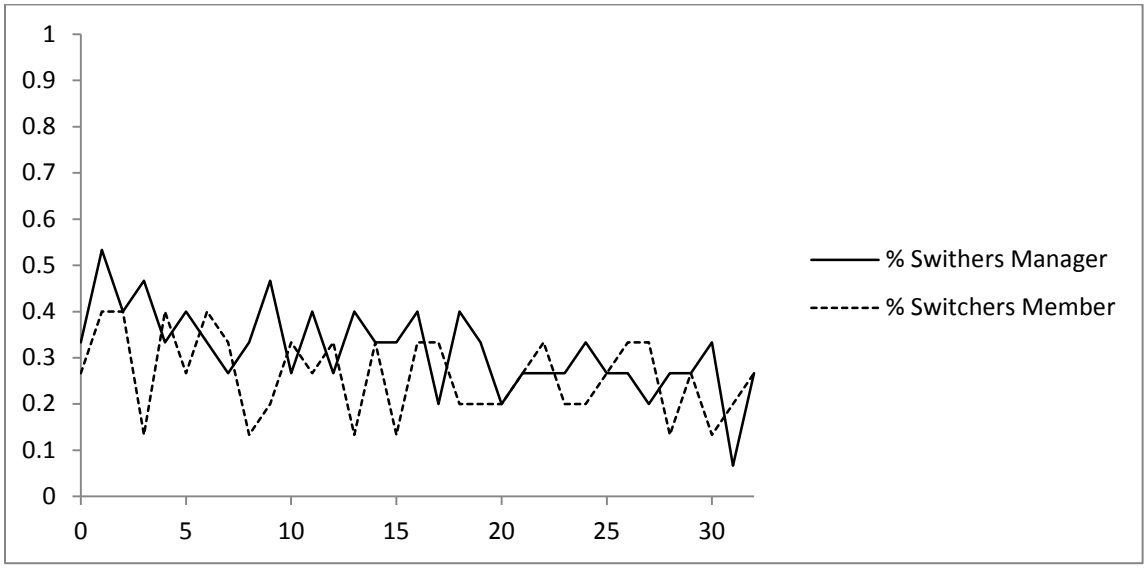

Figure 7 Percentage of Switchers-Treatment 2

In treatment 3 (Figure 8), where A's commission rate is lower but has equal salary as B, percentage of switchers is consistently higher in A than B, but slightly higher in A than B in the latter stage of the whole session. On average, roughly 50% of A switches and 30% of B switches. In treatment 4 (Figure 9), there is not any significant difference between A and B in switching behavior and on average 15% switch. It seems like the more people switch in the most unfair treatment (Treatment 1) and least people switch in the least unfair treatment (Treatment 4).

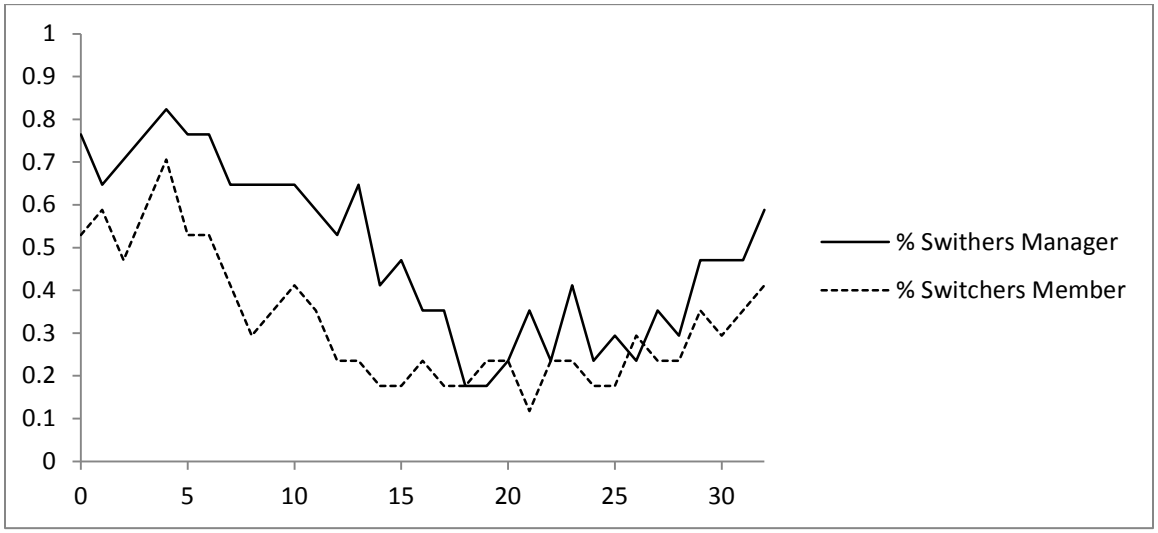

Figure 8 Percentage of Switchers-Treatment 3

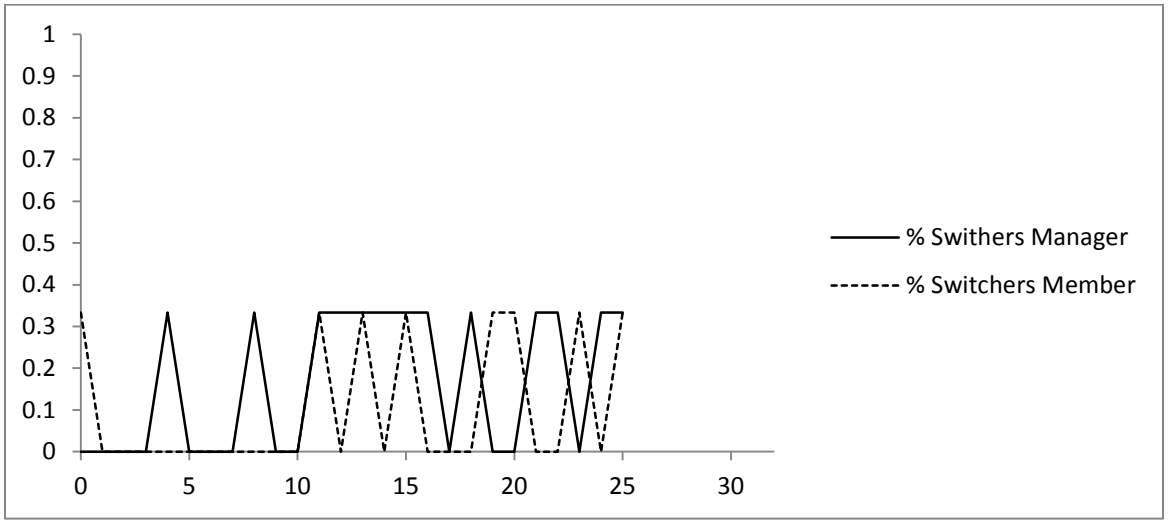

Figure 9 Percentage of Switchers-Treatment 4

Third, I proceed to data analysis by first examining if the efforts can be predicted by the theory across four treatments. In the first treatment, the theory predicts 19 for the A's coaching effort and 24 for the salesperson's selling effort. In treatment 1, I have 10 subjects who participated in the experiment for 32 independent rounds. Because of the complexity of the experiment, I allow subjects to learn the game though repetitive playing and I start to calculate from round 21. So I have 5x12=60 data points for each individual. The mean is 15.846 (standard deviation 10.206) for A's coaching effort and 18.950 (standard deviation 9.252) for B's selling effort. These are significantly lower than the theory prediction with zero envy and zero guilt. Looking across Table 4, Table 5, Table 6, and Table 7, I notice that the efforts are significantly lower that theoretical prediction in all treatments at 0.05 level except for A's coaching effort in Treatment 3, where it's not significantly different than the theory prediction. These results have confirmed the hypotheses that envy and guilt might be non-negative so that I can proceed to the next step of regression analysis.

Table 4
T-test of Treatment 1-Mananager S_m=Low and C_m=Low

	Theory Prediction	Mean (after 20 rounds)	Std. Dev (after 20 rounds)	t-stat*	p-value
A's Coaching Effort	19	15.846	10.206	-2.394	0.020
B's Selling Effort	24	18.950	9.252	-4.228	0.000

*n=60

Table 5
T-test of Treatment 2- Manager S_m=Low and C_m=High

	Theory Prediction	Mean (after 20 rounds)	Std. Dev (after 20 rounds)	t-stat*	p-value
A's Coaching Effort	30	20.406	8.059	-15.973	0.000
B's Selling Effort	30	19.950	7.596	-17.751	0.000

*n=180

Table 6
T-test of Treatment 3- Manager S_m=High and C_m=Low

	Theory Prediction	Mean (after 20 rounds)	Std. Dev (after 20 rounds)	t-stat*	p-value
A's Coaching Effort	19	17.740	10.144	-1.774	0.078
B's Selling Effort	24	19.770	8.877	-6.806	0.000

*n=204

Table 7
T-test of Treatment 4- Manager S_m=High and C_m=High

	Theory Prediction	Mean (after 20 rounds)	Std. Dev (after 20 rounds)	t-stat*	p-value
A's Coaching Effort	30	25.267	8.207	-2.234	0.042
B's Selling Effort	30	22.733	10.053	-2.799	0.014

*n=15

Fourth, I ran a non-linear regression using bootstrap strategy on A's coaching effort as described in Equation (34) and B's selling effort in Equation (35), and obtain the estimates as follows. From Table 8 and Table 9, I find that envy estimates is significantly great than zero from coaching effort on behalf of A (t-stat=1.88, p-value=0.030), but not significantly different than zero from B's selling effort (t-stat=1.32, p-value=0.094). Guilt estimates is not significantly different than zero from A's coaching effort (t-stat=0.61, p-value=0.271), and marginally significantly greater than zero from B's selling effort (t-stat=1.60, p-value=0.055). This says A and B have discrepancy in understanding each other's inequity aversion. While making effort decisions, manager A thinks the lower commission rate is unfair to them and their coaching effort is reduced by a certain amount of disadvantageous inequity aversion, i.e. guilt, α. At the same time, salesperson B thinks they are a little bit guilty but their selling effort decision is not significantly impacted by this feeling of guilty, if there is any. I might think the guilty is minor, but not

sufficient enough at an aggregated level. This makes sense since inequity aversion is built-in inner preference which is hard to guess from dozens of games playing.

Table 8
Envy and Guilt Estimates from A by Non-linear Regression

Parameter Estimates

	Parameter	Estimate	Std. Error	t-stat*	95% Trimmed Range	
					Lower Bound	Upper Bound
Bootstrap	α_c	.047	.025	1.88	.020	.110
	β_{1c}	-.050	.038	0.61	-.147	-.013

*n=1299

Table 9
Envy and Guilt Estimates from B by Non-linear Regression

Parameter Estimates

	Parameter	Estimate	Std. Error	t-stat	95% Trimmed Range	
					Lower Bound	Upper Bound
Bootstrap	α_c	-.017	.028	1.32	-.095	.003
	β_{1c}	.064	.040	1.60	.035	.172

*n=1299

Fifth, and finally, I ran a logit model of quitting decisions. The dependent variables of interests are salary and commission rate of their own, and salary and commission rate of their partners. If they are inequity averse enough, they might quit to another more equitable compensation, even if the exit strategy very unlikely to give them a better expected compensation. I code "Quit" to be 1 and "Stay" to be 0, and run a logit model by allowing salary S_A, S_B and commission rate C_A, C_B, and their differences S_A-S_B, C_A-C_B to enter the model using multiple methods. The results remain quite stable as only salary and commission rate for A remains significant to explain whether A would like to quit or not. The results for B is a little bit difficult to explain because I didn't

manipulate the salary and commission rate for B across four treatments and thus lose some power to explain B's quitting decisions. However, the commission rate for A, C_A remains to be significant in the logit model using multiple methods (Table 11). Recalling Figure 7, the switching behavior of manager A is not obviously differentiated from that of salesperson B in Treatment 2. That is, when A has lower salary but equal commission rate than B, the percentage of people who switch to the other job is not too much different between A and B. With these combined results I can tentatively to arrive at the conclusion that A does not have inequity aversion with respect to salary difference.

Table 10 Logit Model on Manager A's Quitting Decisions

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
C_A	-14.123	1.608	77.124	1	.000	.000
S_A	-.136	.032	18.664	1	.000	.873
Constant	11.627	2.252	26.654	1	.000	112105.702

*n=1299

Table 11 Logit Model on Salesperson B's Quitting Decisions

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
C_A	-3.021	1.269	5.669	1	.017	.049
Constant	-.242	.312	.602	1	.438	.785

*n=1299

In summary, I found $\alpha_c \neq 0$ and $\beta_{1c} = 0$ from A's coaching effort decisions, but $\alpha_c = 0$ and $\beta_{1c} = 0$ from B's selling effort decisions. As for the inequity aversion with respect to salary, I did not find evidence for $\alpha_s \neq 0$ or $\beta_{1s} \neq 0$. Therefore, only hypotheses H_1, H_4, H_7 and H_8 are supported. The results are summarized in Table 12.

Table 12 Hypotheses Testing Results

Hypotheses	Mathematical Form	Supported
H_1	$\alpha_c>0$	✓
H_2	$\beta_{1c}>0$	×
H_3	α_c common	×
H_4	β_{1c} common	✓
H_5	$\alpha_s>0$	×
H_6	$\beta_{1s}>0$	×
H_7	α_s common	✓
H_8	β_{1s} common	✓

4. Discussion and Conclusion

I have conducted laboratory experiments to empirically estimate the disadvantageous and advantageous inequity aversion, i.e. envy and guilt. By running a nonlinear regression as predicted by the theoretical mode, where a sales team composed of a manager and a salesperson and are compensated by salary and commission rates, I have obtained an aggregate measure of envy and guilt. First, I have found the envy do exist in the manager, but guilt is not significant greater than zero so that to impact their effort decisions. Second, envy and guilt are influencing manager's decision on "quit or stay" in the current company. Third, in this coordinated game, manager and salesperson might have not accurate understanding of their partner's true preferences, and this might influence their effort decisions and even their quit or stay decisions.

Admittedly, this essay has several imitations and room for improvement. First, the model is set up to allow lower commission rate and lower salary for the manager, while in reality team managers often have higher salary and lower commission rates. I did not include this case because I want to narrow the focus on the inequity in one aspect. The

add-on higher salary and lower commission rates definitely will makes the problem more complex but would be a fruitful research question to explore as the next step. Second, the experiment is paying subjects credits instead of monetary rewards for performance, and the effect will probably be larger or significant or change the pattern if they are compensated by money. Third, a further analysis of combined logit model and non-linear regression would be worthwhile to obtain a more reliable measure of inequity aversion. In addition, the model could be simplified but added with some more interesting social factors to enrich our understanding of what influences salespeople's inequity aversion.

Nevertheless, this essay is a first attempt to experimentally investigate the influences of inequity aversion in a sales team when team-based reward is used. In the field of team selling salespeople, unfairness in compensation is a big issue, but not so much work has been done to discover the quantified impact of unfairness. This essay points out a direction for future work to experimentally test inequity aversion and consolidate our understanding of salespeople's inequity aversion-envy and guilt.

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Appendices

1. Theory Prediction

With a certain level of $e_s = \bar{e}_s$, the certainty equivalent is modified as

$$CE_m = S - \alpha_s(S_1 - S) + (C - \alpha(C_1 - C))(\bar{e}_s + \lambda_1 e_1 + \gamma e_c e_1) - \frac{1}{2}k\bar{e}_s^2 - \frac{1}{2}ke_c^2 - \delta\bar{e}_s e_c - \frac{1}{2}rC^{a\,2}$$

$$CE_1 = S_1 - \beta_1(S_1 - S) + (C_1 - \beta_1(C_1 - C))(e_s + \lambda_1 e_1 + \gamma e_c e_1) - \frac{1}{2}ke_1^2 - \frac{1}{2}r_1 C_1^{a\,2}$$

Taking the first derivative of CE w.r.t. e_c and e_1 simultaneously, I have

$$\frac{\partial CE_m}{\partial e_c} = C^a\gamma e_1 - ke_c - \delta k\bar{e}_s = 0 \tag{36}$$

$$\frac{\partial CE_1}{\partial e_1} = C_1^a(\lambda_1 + \gamma e_c) - ke_1 = 0 \tag{37}$$

Plug $e_1 = \frac{C_1^a(\lambda_1 + \gamma e_c)}{k}$ into (36),

$$C^a\gamma\frac{C_1^a(\lambda_1 + \gamma e_c)}{k^2} = e_c + \delta\bar{e}_s \tag{38}$$

$$e_c^* = \frac{\frac{C^a C_1^a \gamma\lambda_1}{k^2} - \delta\bar{e}_s}{1 - \frac{C^a C_1^a \gamma^2}{k^2}} \tag{39}$$

$$e_1^* = \frac{C_1^a}{k}(\lambda_1 + \gamma e_c^*) \tag{40}$$

Under the parameters of the experiment, k=.25, $\bar{e}_s = 1$, δ=0.2, γ=1, λ=1, the predicted equilibrium efforts by the model are:

Salary A	Salary B	Commission Rate A	Commission Rate B	ec*(FE)	e1*(FE)
60	65	0.2	0.3	19	24
60	65	0.3	0.3	30	30
65	65	0.2	0.3	19	24
65	65	0.3	0.3	30	30

2. Instructions for the Experiment-A

Introduction

You are about to participate in an experiment on decision making. The instructions are simple, and if you follow them carefully and make good decision, you could earn a considerable amount of bonus points, which will be given to you immediately and privately after the experiment. What you earn today depends on your decisions and the other partner's decisions. Do not look at the decisions of others, talk, laugh or engage in any activities unrelated to the experiment. You will be warned if you violate the rule the first time. If you violate the rule twice, we will cancel the experiment immediately and your earnings will be 0 point.

Your Task in This Experiment

Each of you will take part in a total of N decision rounds. In each decision round, you will be randomly and anonymously matched with another participant to form a team of two.

Your task in every round is to

1) Make a choice between Pay Scheme 1 or Pay Scheme 2.
2) If you decide with Pay Scheme 1, both of you get the same Point Earnings as described in I.
3) If you decide with Pay Scheme 2, you and your partner have to select a Decision Number and both of your earnings are determined as described in II.

How Your Point Earnings is Determined

I. Pay Scheme 1:

Your Point Earnings = $60 + 20\% \cdot \text{TeamTotal} - \text{A Common Cost}$

Your Partner's Point Earnings =

$60 + 20\% \cdot \text{TeamTotal} - \text{A Common Cost}$

II. Pay Scheme 2:

Your task in every round is to select a Decision Number, which ranges from 0 to 30. This is listed in the first column of the "Decision Cost Table". For each decision number, there is associated Decision Cost. Your Decision Cost is listed in the second and Your Partner's Decision Cost is listed in the third column.

When you and the other member of your team have entered your decision numbers, the computer will add them up. We will call the resulting number the Team Total.

$$\textbf{Team Total} = \begin{matrix} 1 + \text{Your Partner's Decision Number} + \\ \text{Your Decision Number} \times \text{Your Partner's Decision Number} \end{matrix}$$

For example, say that you choose the decision numbers10, and your partner chooses 15, then the Team Total = $1 + 15 + 10 \cdot 15 = 166$. As you can see, Team Total will thus reflect both the choices of each team

member regarding his/her decision number. Team Total is the basis of your individual payment.

Your point earnings in any round will equal the payment you receive, as described above, minus the cost of your decision number.

Your Point Earnings= $60 + 20\% \cdot \text{Team Total} - \text{Your Decision Cost}$

Your Partner's Point Earnings is calculated as:

Your Partner's Point Earnings=

$65 + 30\% \cdot \text{Team Total} - \text{His / Her Decision Cost}$

How Your Credit Earnings is Determined

Your and your partner's **Total Point Earnings** in the experiment will be the sum of your Point Earnings received over the N rounds of the experiment.

Your Credit Earnings = **Your** T**otal Point Earnings × 0.001**.

Your Partner's Credit Earnings = Your Partner's Point Earnings × 0.001.

3. Non-linear regression output for coaching effort

Notes

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	Cases Used	Statistics are based on cases with no missing values for any variable used. Predicted values are calculated for cases with missing values on the dependent variable.

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Iteration History[b]

Iteration Number[a]	Residual Sum of Squares	Parameter	
		a	b
0.1	350684.248	-.017	.064
1.1	350684.248	-.017	.064

Derivatives are calculated numerically.[b]

a. Major iteration number is displayed to the left of the decimal, and minor iteration number is to the right of the decimal.

b. Run stopped after 1 iterations. Optimal solution is found.

Parameter Estimates

Parameter	Estimate	Std. Error	95% Confidence Interval		95% Trimmed Range	95% Trimmed Range
			Lower Bound	Upper Bound	Lower Bound	Upper Bound

Asymptotic	a	-.017	766015925011.614	-1502765988284.047	1502765988284.013		
	b	.064	1056718338753.783	-2073064445299.961	2073064445300.089		
Bootstrap[a,b]	a	-.017	.028	-.075	.041	-.095	.003
	b	.064	.040	-.018	.146	.035	.172

Parameter Estimates

		95% Trimmed Range
	Parameter	Upper Bound
Asymptotic	a	
	b	
Bootstrap[a,b]	a	.003
	b	.172

a. Based on 30 samples.

b. Loss function value equals 350684.248.

Correlations of Parameter Estimates

		a	b
Asymptotic	a	1.000	-1.000
	b	-1.000	1.000
Bootstrap	a	1.000	-1.000
	b	-1.000	1.000

ANOVA[a]

Source	Sum of Squares	df	Mean Squares
Regression	182477.752	2	91238.876
Residual	350684.248	1297	270.381
Uncorrected Total	533162.000	1299	
Corrected Total	82397.409	1298	

4. Non-linear regression output for selling effort

Dependent variable: EffortW[a]

a. R squared = 1 - (Residual Sum of Squares) / (Corrected Sum of Squares) = ..

Notes

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	N of Rows in Working Data File	1299
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used. Predicted values are calculated for cases with missing values on the dependent variable.
Syntax		MODEL PROGRAM a b. COMPUTE PRED_=4* (C1 - b * DiffC) * (1 + (16 * (C - a * DiffC) * (C1 - b * DiffC) - 0.2) / (1 - 16 * (C - a * DiffC) * (C1 - b * DiffC))) . CNLR EffortW /FILE='C:\Users\yyang\AppData\Local\Temp\spss8644\SPSSFNLR.TMP' /PRED PRED_ /BOOTSTRAP /CRITERIA STEPLIMIT 2 ISTEP 1E+20.
Resources	Processor Time	00:00:00.92
	Elapsed Time	00:00:01.03

Iteration History[b]

Iteration Number[a]	Residual Sum of Squares	Parameter	
		a	b
0.1	350684.248	-.017	.064
1.1	350684.248	-.017	.064

Derivatives are calculated numerically.[b]

a. Major iteration number is displayed to the left of the decimal, and minor iteration number is to the right of the decimal.

b. Run stopped after 1 iterations. Optimal solution is found.

Parameter Estimates

	Parameter	Estimate	Std. Error	95% Confidence Interval		95% Trimmed Range	95% Trimmed Range
				Lower Bound	Upper Bound	Lower Bound	Upper Bound
Asymptotic	a	-.017	766015925011.614	-1502765988284.047	1502765988284.013		
	b	.064	1056718338753.783	-2073064445299.961	2073064445300.089		
Bootstrap[a,b]	a	-.017	.028	-.075	.041	-.095	.003
	b	.064	.040	-.018	.146	.035	.172

Parameter Estimates

	Parameter	95% Trimmed Range
		Upper Bound
Asymptotic	a	
	b	
Bootstrap[a,b]	a	.003
	b	.172

a. Based on 30 samples.

b. Loss function value equals 350684.248.

Correlations of Parameter Estimates

		a	b
Asymptotic	a	1.000	-1.000
	b	-1.000	1.000
Bootstrap	a	1.000	-1.000
	b	-1.000	1.000

ANOVA[a]

Source	Sum of Squares	df	Mean Squares
Regression	182477.752	2	91238.876
Residual	350684.248	1297	270.381
Uncorrected Total	533162.000	1299	
Corrected Total	82397.409	1298	

Dependent variable: EffortW[a]

a. R squared = 1 - (Residual Sum of Squares) / (Corrected Sum of Squares) = ..